1979

Manpower feasibility study with implications for Vocational-Technical Education in Bendel State of Nigeria

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A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements for the Degree of
DOCTOR OF PHILOSOPHY

Major: Industrial Education

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Iowa State University
Ames, Iowa

1979

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I: INTRODUCTION

Background Information

Every living organism that grows, develops and matures, encounters developmental problems at each stage of development. The same is true of nations in their struggle to grow and develop. A close look at the history of the developed nations revealed that numerous techniques or strategies were employed in solving the developmental problems. The most commonly used method was universal compulsory education. Varied educational programs, designed and directed at particular problem areas, were often used. For example, the problem of shortage of middle manpower was solved or partially solved through training programs in secondary and post-secondary vocational-technical schools, apprenticeship programs and in-plant training programs.

Nigeria has been an agricultural country basically with few industries. The present decade has witnessed a dramatic change in the Nigerian economy. The trend is toward industrialization. Nigeria is becoming an industrialized nation having different types of industries including petroleum, steel, rubber, cement, and automobile industries. This trend necessitates a corresponding change in the role education should fulfill in the country.

One of the most common criticisms against education is its concern with abstract concepts that are of limited value

to humanity without the effective application of those concepts to the benefit of society. Education must serve a definite purpose and be a useful tool for improving and transmitting culture. Functional education cannot be achieved by focusing only on abstract concepts and theories.

The "Ten Year Education Plan" of 1944 discussed the type of education to serve Nigeria's needs in the following words, as quoted by Ikejiani et al. (36, p. 7):

> In order to prevent the drift of semi-literates to the towns the first consideration is to provide elementary education in the village with a strong rural bias suited to the environment and local needs of the neighborhood.
>
> The aim will be to provide the village child with such an education as will enable him to become a more useful member of the village, whether as a farmer or a craftsman.

Although the true intent of this policy or philosophy is obviously dubious taken literally, the statement contained some ideal educational philosophy which, if truly pursued, would have resulted in a different system of education for the country than that which actually took place. Rather than make the Nigerian youth love and cherish agriculture as farmers, or love and value practical and productive work as craftsmen, the educational system has done a very good job of alienating the youths from these vital aspects of life. The average educated Nigerian youth does not only dislike these occupations for being unworthy of the educated, but looks down on those who practice them.

In his discussion of the problems facing Nigerian education, Ikejiani et al. (36, p. 8) listed and discussed one of the problems in the following words:

> A third major problem is the ascendency of grammar schools over any other kind of education in Nigeria. To push a pen behind an office desk is the dream of an educated Nigerian. Anything less is held to be derogatory and below his dignity.

Coupled with the "grammar school pride" is the West African School Certificate which served as the only opener to government employment. The opportunity to earn this certificate was closed to students of other school curricula as no technical qualification/certificate was considered its equivalent. The West African School Certificate issue constituted a major barrier to the graduates of vocational-technical schools who wished to gain admission into the universities. Apart from this hindrance which the West African School Certificate presented to graduates of vocational institutions, the examination leading to the award of the certificate also depended on the instructional curriculum of British secondary schools. Unfortunately, too, the technical school examination leads to the award of the City and Guilds Institute of London Certificate.

Because of the foreign examination requirements, coupled with the emphasis placed on the acquisition of the certificate, vocational education curriculum in Nigerian schools bears no relationship with local occupational demands. Commenting on the effect of external examination on the curriculum, Fafunwa

(24, p. 46) stated:

> It is an educational truism that external examinations control the curriculum and whoever controls a country's examination system controls its education, no matter how magnanimous and sympathetic the controller.

In a most consistent effort, Okeke tried to impress it upon the minds of those who direct the educational system in Nigeria that the focus, the ultimate goal, or the end result of education, should be its practical application. Knowledge which cannot be applied to the solution of everyday life's problems served no useful purpose. The practical use into which the acquired knowledge is deployed is the only thing which is important. The utilization of education or knowledge pervaded his entire writing. In the following concluding paragraph of a section in his paper, Okeke laid emphasis on the individual's ability to put knowledge into practical use; instead of acquiring the piece of paper called "certificate" which has no value by itself:

> If we are to educate our children to use their education ...we must do away with the cult of the certificate--we want work done, not diplomas and degrees; we must do away with external examinations which still hold us to ransom in the hands of former colonial masters and enable them to perpetuate the objective of imperialism--cultural imperialism is worse than political domination; we must give prestige to other schools than grammar schools;.... (36, p. 107).

However, most Nigerians who relized the ills which pervaded our total educational system have expressed their approval of the recent Federal military Government measures aimed at bringing about a shift of emphasis in the nation's

educational system. Responding to an interview by the co-producers of a documentary file on education in Nigeria, Col. Ali, the Federal Commissioner for Education under the Federal Military Government, revealed that the Universal Primary Education curriculum would, among other subjects, include normal primary school subjects, vocational subjects and local crafts. In addition, the Commissioner said that the Government had planned to run secondary technical schools along with secondary grammar schools (57, p. 13).

However, many changes still remain to be initiated and implemented, if Nigerian education, particularly vocational-technical education, is to meet the needs of industry and labor. Lack of involvement by industry, labor and business, and other employers, both public and private, in initiating, developing and planning occupational programs, has resulted in many defects in the curriculum and training of craftsmen and technicians in vocational and technical institutions in the country.

The nature of the occupations for which training is provided in vocational-technical schools is characterized by change. Most of the changes, which should have necessitated a change in training programs and curriculums, exist without the school's knowledge. As a result, the schools have not fulfilled their roles as instruments of change. This is partly due to the separation existing between the schools and industry/labor.

The schools train students for occupations which do not exist locally while at the same time overproduce graduates in other occupational areas which do exist. On the other hand, the schools lack the financial capability to simulate the actual work environment of the occupations in the workshop/laboratory, and in most instances, there is no work-experience or industrial training internship programs for vocational-technical school students. Consequently, there existed a prevailing low level of practical skill, among graduates of vocational-technical schools, which has created some barriers in their acceptance for industrial positions. Efforts must be made to bring about cooperation between industry/labor and education in planning relevant training programs for vocational-technical students. An example of the type of required joint effort was reported by Wolansky (81, p. 60) concerning "Industrial Education" and "Construction Industry":

> ...the Master Builders of Iowa (MBI)--builders and contractors association--became concerned with the role schools should play in making students aware of the career possibilities in the construction industry; and invited department heads of industrial education in the two universities in Iowa to consider how to...prepare more industrial arts and vocational teachers for teaching construction at the secondary and post secondary levels.

To adequately serve the needs of our youths, the nation's educational system must be diversified enough to cater to the wide range of abilities and interests that characterized the Nigerian youth. Moreover, the educational programs should be designed to meet immediate and anticipated occupational needs.

The technical content of a great many types of jobs is increasing; some that were formerly classified as skilled crafts now begin to take on aspects of a technician's work. Complicated design requirements have become an integral part of most jobs. Hence, most workers, particularly those charged with the added responsibility of guiding and directing the operation of the other workers, require some basic knowledge and skill of graphic communication and management skills. Automation has eliminated certain tasks that were formerly performed manually. Machines are now used to perform most production operations. All that is required of the worker is the ability to operate skillfully the machines and to assemble the final product in the factory or on the job site. In other instances, skilled workers perform periodical analysis, testing, and monitor quality of production. These and other developments further require a close cooperation between industry and vocational-technical education.

Most of the qualified students who applied for admission into the high schools could not be admitted because of the dramatic increase in secondary school population and limited accommodation in Nigerian schools. The phenomenal growth in population with its attendant social and economic problems should necessitate a shift of emphasis in the county's educational system. At the present rate of growth, the country's population might be doubled by the end of this century. About 45% of the population is under 25 years old and, as in most

developed and developing nations, nearly half of the projected increase in the labor force in the next 25 years will occur among persons between 15 to 25 years of age.

With the take-off of the Universal Primary Education, and free post-elementary schools, many people are presently receiving education. There is a renewed interest in schooling. Most Nigerian youths and adults who stopped going to school in the last 10 years because of the high cost involved have returned and are now receiving formal education.

The population of Nigerian schools, mostly in the elementary schools, had also undergone dramatic changes. There was a tremendous increase in the number of students. The increased ratio of male to female students, and the wide range in ages of students, constituted the other aspects of the change. Most of these changes have important implications for post-primary education, particularly vocational-technical education.

Educators in the United States of America still acknowledge some of their presidents who showed great interest in education, particularly vocational-technical education. In "Proposal for Vocational Education", Stephens (67, p. 1-2) wrote:

> The three most recent occupants of the White House have also expressed a keen interest in furthering vocational education programs. Presidents Eisenhower, Kennedy, and Johnson have repeatedly urged the general public, the several states, and congress to expand educational opportunities for the youths and adults of this country.

> This is clearly evidenced by their calling of several national conferences for the study of education and by their sponsorship of legislation designed to stimulate vocational and technical training and retraining programs.

The renewed interest, emphasis and faith in vocational-technical education made it necessary for educators, particularly those in vocational-technical education, to engage in efforts designed to bring about improved programs of vocational education. This is not to assume that such efforts were not made previously. E. Hussey (35b) former director of education in Nigeria, in his lecture in Oxford on "Some Aspects of Education in Nigeria" said:

> At the top of the educational ladder comes the higher college recently established in Yaba, near Lagos.... It is vocational in the sense that students are prepared for specific careers, and there is at present no "Arts" courses. Such a course may be started when there is an obvious need or demand for it.

Although it can be assumed that the vocational programs were established as the need arose, the current situation of the country's vocational-technical programs did not seem to support this assumption. Moreover, there needs to be some consciously organized effort and procedure for identifying manpower needs. The nature of vocational programs is such that unless programs are designed to meet the identified needs, they have very little probability of success.

As a result of the recent measures by the Federal Military Government, aimed at elevating the status of advanced vocational-technical degrees, there is likely to be a tremen-

dous increase in the enrollment of vocational-technical institutions. And unless great care is exercised in the design of programs and in placement of students in training programs, vocational-technical school graduates will soon face situations similar to, or even worse, than those of grammar school graduates. To avoid overproduction of graduates in certain areas while underproducing in other areas requires skillful planning of quality vocational-technical programs to meet both present and future manpower needs. In the paper presented to the Vocational-Technical Education Subcommittee of the Joint Committee on Education, the Iowa Department of Job Service (19, p. 18) stated the important features of vocational-technical education thus:

> Vocational education has been defined as instructional activities and experiences through which one develops skills for a work role. These skills, though, cannot be put to use unless there is a need for such a work role. In other words, vocational education and the skills they provide can only succeed when there are jobs available requiring these skills. Any money spent on vocational programs should be spent on training programs for those occupations where there is a reasonable opportunity for employment.
>
> Student interest, while necessary for success in an occupation, does not guarantee a job opening. Students need much information on choosing careers, such as exploratory programs or cooperative education and employment opportunities before they enter the labor force.
>
> If students are trained in occupational areas with few available jobs and/or large numbers of other jobseekers (CETA trainees, the unemployed), students become frustrated jobseekers and the time and money expended in the training is a waste. Also, with respect to the Iowa Department of Job Service, training in the wrong occupa-

> tions increases the supply of workers for a limited number of jobs and hampers placement efforts for those workers.
>
> How should new programs be created? These should be stimulated by the need for workers so trained. In order to do this, vocational educators need to look ahead to identify future needs, rather than looking backwards or merely maintaining the status-quo. Occupations other than those with established program offerings should be considered for new training programs.

To meet our present and future manpower needs effectively, vocational-technical schools will rely on manpower projections and other feasibility research findings. For guidance purposes, only the general direction or trends, and the size of future employment needs, will be required.

Projections for future vocational-technical employment needs for the nation might be available and contain useful information, but they fall short of specifics needed in order to plan for training at the local or state level. More specific data about the local area must be collected to estimate precisely the training needs.

The State vocational-technical education planners need to have quantitative information on which to base their decision on expansion, or reduction if necessary, of existing programs, and/or the establishment of new ones. Such quantitative data might also provide useful information needed for planning physical facilities and equipment, and the mode of training that would be utilized to produce the type of worker demanded by today's employers in business and industry.

To facilitate such decisions as detailed above, specific information about skilled and technical manpower needs in the various vocational-technical occupations must be obtained.

Statement of the Problem

The concern of the Federal Military Government and other states' governments to provide adequate and meaningful vocational-technical education for a section of Nigerian youths has been stated. The huge investment which the various governments, particularly Bendel state government, had made in vocational-technical education necessitated a survey or an organized and systematic study to determine both present and future manpower needs of the state, with implications for vocational-technical education program improvement and development.

The problem of this study was to determine the current number of workers, both skilled workers and technicians, and the number that would be needed in Bendel State of Nigeria by March 1980 and March 1982. The study focused on the demand for trained manpower in both public and private sectors in the occupational areas of: (1) agriculture, (2) mechanical/automobile, (3) contruction industry, (4) manufacturing industry, (5) business and office, by job titles, (6) printing, publishing and allied industries, and (7) service industry; and how: (1) public vocational-technical schools and (2) in-plant training programs are responding to the manpower needs.

Objectives

The objectives of the study were:

1. To find out the current number of trained workers needed in each occupational group by job title.
2. To analyze the anticipated employment growth in the two grade levels of manpower--skilled and technicians.
3. To ascertain from employers the number of trained workers he/she hopes to have on the payroll by 1980 and 1982 from graduates of their training programs.
4. To find out the percent of replacement needs for persons leaving the labor force due to retirement, death, promotion, or other reasons, per year in each occupational area by job title.
5. To estimate the need for trained manpower in the various occupational groups by 1980 and 1982.
6. To obtain from the employers their estimation of the availability of trained persons in the different occupational groups, by job titles. The following indicators of availability were used: short, adequate, and oversupply.
7. To determine the extent to which public vocational-technical schools meet the labor demand of business and industrial establishments in the state.
8. To predict using the "General Linear Model" the number of skilled and technician workers that will

be needed in the state, by occupational group, in 1985.

Purposes of the Study

The study would serve these purposes:

1. To project the need, if necessary, for the establishment of other vocational-technical program(s) to be offered in Bendel State.
2. To provide the bases for diversification of curriculum offerings in vocational-technical schools in Bendel State.
3. To collect statistics concerning employers' needs and make such statistics available to the Ministry of Education and the Technical Education Board, upon which to base decisions for facilities, equipment, and other budget plans.
4. To determine the need for trained workers as projected by employers.
5. To justify government expenditure in vocational-technical education in Bendel State.

From a synthesis of other research findings in the area of manpower, Meyers (53, p. 29) reached this conclusion:

> More planning information is needed by program directors of area schools on the kind and characteristic of the manpower needs as well as complete industry and business involvement.

The Iowa Department of Job Service prepared projections

of future occupational demand based on unemployment insurance and census reports. These projections included needs due to occupational growth and replacement of workers who are expected to leave the labor force. Such projections reflect the total demand and the future supply of workers in the various occupations (19, p. 18).

Assumptions Underlying the Study

The basic assumptions made in this study were:

1. Employers, both public and private, within Bendel State of Nigeria could most realistically report their present level of employment.
2. It was further assumed that these employers would, in like manner, be able to project their need for trained workers more accurately than any external source can be expected to do so.
3. Also it was assumed that a comprehensive list of employers who had ten or more fulltime employees on their payroll would be available in either the Ministry of Establishment or Department of Labor.
4. Employers would be able to estimate, fairly accurately, the percentage of workers who will potentially leave employment due to death, retirement, resignation, and promotion each year based on what this percentage had been for the past years.
5. The exact number of employers in Bendel State who

employ ten or more regular employees on their payroll was not known. However, it was estimated that the number of such employers would exceed 300.

6. Employers or employers' delegated representatives had the ability to provide accurate manpower data relating to their establishment.

Delimitation or Scope of Investigations

This is a manpower feasibility study/survey. Its purpose was not to determine training requirements at the two levels of skilled and technical manpower. In other words, this study did not cover occupational or task analysis and job requirements.

The study was limited to Bendel State of Nigeria, and only employers who had at least ten regular or permanent employees on their payroll were included in the survey. Furthermore, these employers had to be recognized by the Ministry of Establishment or Department of Labor. Hence, employers who did not register their business in the state were not included in the survey.

The only information that was of interest and considered to be relevant to the needs of this study was that information concerning the number of workers presently employed in the categories of skilled and technical manpower, current number of vacancies, the anticipated number of workers by 1980, 1982, the attrition rate, and the availability of manpower to replace those workers who were expected to leave the labor force, and to fill the new vacancies that would be created due to expansion.

In looking at the training programs--in-plant training

and public vocational-technical school programs--it was not considered necessary to look at the organization of the programs. The objective of this study was satisfied by obtaining information about the turnover rate of manpower at the two grade levels of skilled and technician. To satisfy this purpose only a frequency count of students in the different training programs was taken according to year in training.

There were many mechanical, carpentry, and electrical workshops organized by highly skilled craftsmen as small-scale businesses. The master craftsmen provided apprenticeship training to interested youths and adults. These training programs were also included in the study as a type of in-plant training programs since most of the trainees are usually absorbed by their masters at the end of the apprenticeship period, while others find employment in business and industries.

The potential user of this study should recognize the risk implied in the general linear model for manpower projections in a developing country. Rapid economic, technological or political changes or emphasis may alter the outcomes of this projection method for a specific cluster or job title.

Definition of Terms

The purpose of this section is to acquaint the reader with the meanings of terms that were frequently used in the study. It is hoped that these definitions will enable the reader to gain a better understanding of the study.

In-plant (apprenticeship) training: It is an organized system of training in which on-the-job experiences are

provided by a worker who might be functioning in the capacity of an employer to a learner who seeks to acquire the techniques of performing a given job. According to the International Labor Office, a period of long-term training substantially carried out within an undertaking and regulated by a verbal or written contract which imposes mutual obligations on the two parties, the trainee and, normally, an employer who has assumed responsibility for giving the trainee initial training for a trade or other occupation, is basically what it involved (37, p. 11).

This definition bears a very close relationship with the definition given in the American Vocational Journal (3, p. 25).

Balanced program: Balanced program in terms of manpower development program was defined by Arnold (6 , p. 9) as a program which is tailored to the requirements of communities and defined areas, yet does not lose sight of the pattern emerging in the state and national labor market.

DOT: Dictionary of Occupational Titles. This document contains a very detailed and comprehensive lising of all the job titles that have been identified in all the occupational areas in the United States.

GLM: General Linear Model. This is a statistical method that assumes a linear relationship between two variables. It permits prediction of one variable from the other to be made after a regression line has been established or drawn between

the variables. The procedure uses the principle of least squares to fit a fixed-effects linear model to virtually any type of data. The procedure performs both univariate and multivariate analyses, including simple linear regression, multiple linear regression, analysis of variance, analysis of covariance, and partial correlation analysis (7 , p. 127).

Job/occupational titles: These identification labels distinguish between the work roles of employees in the different occupational clusters. To some extent, the job titles reveal and/or describe the duties/responsibilities attached to each job position. Hence, various work activities performed by a worker are designated by a title.

Manpower: Manpower is an economic resource just as material, equipment, electrical energy, and money are economic resources. Manpower in the economic sense is the managerial, scientific, engineering, technical, skilled and other personnel employed in creating, designing, developing, managing, and operating productive and service enterprises and economic institutions (2, p. 1).

Manpower resources: The number of people available at a specific date to perform the work of the nation; in the case of forecasts, the number expected under stated assumptions to be available at a specific future date; in other words, the supply of manpower (2, p. 1).

Manpower planning board: The state manpower planning board was established by a government edict to assess state

manpower needs through surveys. Manpower planning and development, on the basis of current demands and projected future needs, constitute the major responsibility of the board.

Program: A logical sequence of subjects or courses scheduled for student learners in a particular school system. Through a planned progression of courses in which different and varied learning experiences are provided, the students acquire a desired training, attitudes, habits, skills and knowledge. The term program was defined by Good (33, p. 442) as:

> All courses in one field of study, such as business education or industrial trades, organized to fulfill the same general objectives and conducted along similar lines.

Service occupations: As defined by Applegarth (5, p. 9) it means those occupations concerned with the performance of services concerned with the protection of individual's, public, or private property; occupations related to the cleaning of the interior or equipment of buildings; and occupations related to the operation of various amusement and recreation facilities. Specifically, in relation to this study, the service occupations are those connected with electrical and electronics systems.

Skilled worker: An individual who performs the actual manipulative activities with the use of special tools and instruments. A job of this type demands considerable training

and/or experience, thorough and comprehensive knowledge of process and technicalities of the work, the exercise of independent judgment and usually a high degree of manual dexterity. Workers in this capacity usually become qualified through a long period of apprenticeship training or by completing a comprehensive program in a vocational school.

Technician: Various definitions of this term have been given by different authors. The definition which closely approximates the meaning as used in this study was given by Wolansky (82, p. 4) as follows:

> A worker on a level between the skilled tradesman and the professional scientist or engineer. His technical knowledge permits him to assume some duties formerly assigned to the graduate engineer or scientist. For example, technicians may design a mechanism, compute the cost, write the specifications, organize the production and test the finished product.

The technicians' duties demand an extensive period, at least two years, of formal training, in which both theory and practice are equally emphasized, at the level of post-secondary education.

Technical institutes (colleges): Quoting from "Educational Development in Africa", by International Institute for Educational planning, p. 144, Osuala (61, p. 14) wrote:

> An institution which offers courses of different lengths at the professional and subprofessional levels for full-time, part-time and evening students. The courses are organized into departments and cover both technical and commercial subjects. Entry qualifications vary according to the nature and level of the courses, usually the completion of secondary education at the ordinary level is a minimum requisite.

Vocational-technical institution: This is a form of comprehensive technical institution where occupational training is provided at both skilled and preprofessional levels.

Vocational education: This system of education, which is designed to prepare students for entry-level job skills, stresses the acquisition of manipulative competencies. Program graduates enter employment as skilled workers. In some cases, however, a short period of on-the-job training or orientation might be required before efficient performance on the job can be attained.

Organization of the Study

The material presented in this study was organized into chapter headings. The introductory materials presented in the first chapter were subdivided into background information, statement of the problem, objectives, purposes of the study, assumptions underlying the study, delimitation or scope of investigation, definition of terms, organization and method of procedure.

In the second chapter, the author presented summaries of writings and research studies related to manpower supply and demand, and manpower training programs.

Chapter three presented the study design, under which the selection of sample, the survey instrument (questionnaire), the collection of data, its treatment, and the GLM statistical technique were outlined and discussed in detail.

The findings of the study were presented in chapter four, which was followed by a discussion of the findings in chapter five. Chapter six contained the summary, conclusions, logically deducted from the findings, and recommendations. Effort was made to summarize chapter two which contained the review of literature. Finally, a list of references used in the study was presented, followed by appendices.

Method of Procedure

The procedure used by the author in conducting the study was as follows:

1. After the choice of the research topic was made, related and similar research studies and writings were sought, obtained and read to broaden the author's ideas and knowledge of the topic. A clear definition of the topic was made possible through a thorough knowledge of what has been done in the area.

2. A decision was made on the type of information or data required. On the basis of that decision, the sources of data were determined. The size of the population and the sampling technique were then determined. When later it was found that the population universe did not exceed the 350 limit specified in the design, the sampling was not necessary.

3. The research instrument was developed.

4. Determined analysis technique to be employed in the treatment of the obtained data, and the method of reporting

the findings were likewise determined.

5. A budget was prepared and application for a research grant from the government of the state of Bendel in which the research was conducted was sought and obtained.

CHAPTER II. REVIEW OF LITERATURE

Introduction

This chapter presents a review of text materials, conference reports, pertinent writings, surveys and research studies relevant to the problem of this study.

The materials presented in this chapter were organized into five sections. Sectional headings included: (1) several basic problems and shortcomings in Nigerian education; (2) planning, implementing and maintaining occupational programs; (3) several basic problems and criticism of manpower research; (4) manpower research and survey reports; and (5) summary.

Generally, there are three broad categories of manpower in every nation's labor force. These are high-level manpower, intermediate level manpower and lower-level manpower. The intermediate manpower group has been considered by most people as the most important single determinant of technological advancement in any nation. Also, this group constituted the area of greatest manpower need in both developed and underdeveloped nations. Support for this claim is found in the speech of the former Associate Commissioner for Adult, Vocational and Technical Education, U.S. Office of Education, Dr. Robert M. Worthington. Dr. Worthington (80, p. 263) in an opening speech before the Technical Education Conference presented the following significant concepts:

> It is becoming increasingly clear that the largest increase in job opportunities in the Nation's workforce is now and will continue to be for persons who have earned less than a baccalaureate degree but who have the specialized skills and knowledge to support the professionals in the Nation's work.

Also in Nigeria, particularly in Bendel State, the largest increase in job opportunities as reflected in labor demand, is for skilled and technician workers.

Prior to embarking upon the National Development Plan for 1962-1968, with the assistance of different regional and international commissions, the potential resources for economic development were surveyed. Included in the resources examined was the human resource--skilled manpower (47, p. 3).

Several Problems or Shortcomings in Nigerian Education

Similar to the history of education in other nations, at a certain stage in the educational development in Nigeria, the demand for education greatly exceeded the funds available to provide education to meet the demand. Lewis (47, p. 42) in his attempt to provide an explanation of the forces generating the demand for more education stated:

> It was without question, the genuine expression of a people who had come to realize in varying degrees that their place in the changing world would be determined by the rate of educational advance and of the application of modern knowledge to their daily affairs.

There was a general discontent by Nigerians with the type of education provided by the colonial government. People were dissatisfied with the nonavailability of higher education and

with the quality of education they were receiving and the consequent low rating of their training. Quoting the comments of Dr. Kenneth Dike on the attitudes of the people toward the educational system, Lewis wrote:

> The Nigerian discontent was concerned not so much with the contents of education. To a great extent the arguments as to whether there should be more of industrial and technical than of literary education did not very much concern the majority of Nigerians. The overriding complaint was that there was not enough education--of any kind--for the masses of the people.... The kind of education offered under the British Colonial regime prepared them only for subordinate positions in all walks of life.... In nationalist parlance, therefore, Nigerians were being educated by the British overlords to fill the role of "hewers of wood and drawers of water." Even when a university institution was founded in the years 1930-1934, in the form of Yaba Higher College, its graduates were rated inferior, in terms of salary and status, to graduates of British universities.... Of the first 181 graduates of the college, 38 became either medical, agricultural, or forestry assistants; 19 graduated as engineers, and six as surveyors. The rest were absorbed into educational, administrative and technical services, as subordinate technicians and clerks (47, p. 42).

In his writing titled "Education for Efficiency," Ikejiani et al. (36, p. 87) discussed the relevance of the content of Nigerian education to the needs of the nation. He started by probing the extent to which the content of education, on which approximately ₦ 56.5 million (about 84.75 million U.S. dollars) were spent in 1962-1963 fiscal year, met national needs. Further, after a brief discussion of the meaning and purpose of education, he said that in spite of the striking progress made in the field of education in Nigeria, the type of education given has not only failed to meet Nigerian needs,

but it has produced inefficiency. He observed that since independence, no attempt has been made to overhaul the educational system as to achieve a balance between primary, secondary and higher education, between general and vocational studies, between humanities and sciences; or between institutional and in-service training.

To achieve the desired balance required a very close cooperation among administrators of primary, secondary and higher education on the one hand and business, industrial and labor directors on the other hand.

To uncover the major problem confronting Nigerian education since the era of colonial government was the main focus of this chapter on "Education in Nigeria". In this section, Okeke in (36, p. 899) carried out a critical analysis of the problems which have plagued the nation's education system. Listed serially, the second major problem was that of the West African Examination Council's School Certificate (previously referred to) which every secondary school student strives to acquire as a passport to government employment. The writer correctly pointed out that as long as the incentive is there--a civil service job--there is no way to break the vicious circle however much we desire to do so.

The ascendancy of grammar school over any other kind of education in Nigeria was considered a serious problem which has been sustained and perpetuated by the recruitment and placement policies in government and other establishments.

Okeke in (36) noted that these bodies recruit staff largely from the graduates of grammar schools and pay them wages better than any other group.

In his discussion of the curriculum and how it could be related to National needs, Fafunwa (23, p. 271) made reference to how the Nigerian press, in the fifties, particularly in 1952, was extremely vocal on the question of relating higher education to the needs of the Nigerian society. His personal opinion on the issue of relating education to national needs was expressed as follows (23, p. 272):

> Whether at the primary or university level the curriculum should reflect the environment in which it operates....

In support of his opinion, Fafunwa (23, p. 272) quoted the following section of the resolution of the UNESCO's conference held in Tananarive on the development of higher education in Africa in 1962:

> ... It is necessary to stress the need for the use of African material in the teaching of all subjects and at all levels of education....

Nigerian philosophies of education

The philosophy of secondary education in Nigeria, which of course included technical and vocational education has been detailed by Taiwo (69, p. 27-30) as:

1. To afford a large number of children the opportunity of education of high quality irrespective of their social background.
2. To diversify the curriculum so as to cater for differences in talents and to anticipate the variety of

opportunities open to the students after completing the course.
3. To inculcate the spirit of self-reliance, industry and versatility.
4. To equip the student to live effectively in a modern age of science and technology.
5. To impress on the students their privileges and responsibilities as citizens of Nigeria.
6. To develop and project Nigerian culture, arts and languages.
7. To develop a sense of spiritual and moral values, integrity and uprightness.
8. To raise a generation of people who can think for themselves, have respect for the views and feelings of other people and respect the dignity of labor, appreciating that majority of Nigerians live in rural areas.
9. To foster the unity of Nigeria and emphasize the ties and the common elements which unite the states.
10. To fire the students with the desire for achievement and excellence and for continual self-improvement.

Philosophy numbers 2, 3, 4, and 8 relate directly to vocational-technical education. They express in broad terms, the terminal objectives of vocational education at the post-primary and post-secondary levels.

However, it is the opinion of some Nigerian educators, that vocational-technical education in Nigerian had no well-defined philosophies and/or objectives. This group of educators do not want to accept the position that vocational-technical education is part of general education. They advocate a complete separation of the two educational systems. Hence, they failed to recognize vocational education philosophies stated under the broad heading of "Philosophies of Secondary Education".

Osuala (61, p. 152) discredited state governments which did not discriminate between vocational and general/liberal

education in their statements of philosophies and objectives. Taking such an extreme position he declared:

> Recent public educational Edicts of the 1970's by the various state governments have not eliminated the... confusion in nomenclature. Technical and vocational education is still regarded as another secondary school without a clear delineation of its philosophies and objectives.

Other educational and economic problems in Nigeria

According to Osuala (61, p. 1) in Nigeria, as in many developing countries in Africa, there are two major constraints on industrial development: a shortage of qualified manpower and a lack of adequate technical and vocational education. In Nigeria, the problem of industrial development is complicated by the limited access to modern production equipment and a low level of technical competence. Both of these limitations are directly related to the absence of well-developed programs of technical and vocational education.

The shortage of technically qualified manpower is perhaps the principal limiting factor to future economic growth. Quoting the report of a survey conducted in 1972 by the Nigerian Economic Society, Osuala (61, p. 6) wrote:

> A report of a survey conducted in 1972 revealed that eighty-eight percent of the rural businessmen in the western states of Nigeria have less than eighth grade education and forty-five percent are virtually illiterate. Only twenty-one entrepreneurs had formal technical education before entering business. Seventy-two percent of the businessmen interviewed indicated that they would like some technical and vocational training if it were offered.

Hence, it could be said that more and more people are seeking technical training or have the desire to be so trained as to become more productive in their respective positions.

The Central Planning Office (58, p. 390) identified two features characteristic of the system of vocational-technical education in Nigeria to be: its rigid formalization of the process of skill training and its remoteness from and insensitivity to developments in the labor market. Courses are planned or expanded not in response to any known demand but respond to the ease with which such courses could be established. For instance, without any known basis, almost all of the existing trade centers offer, and in most cases start off, with courses in automobile engineering and motor mechanics, which accounted in 1972 for one-fourth of the total enrollment.

The concentration of vocational-technical students in one program also revealed the lack of occupational guidance services which of necessity should constitute an integral part of the technical and vocational training curricula. The effect of such defects in occupational training programs soon will start manifesting itself in a high rate of unemployment among graduates of vocational schools. Efforts must be made to prevent such wastage of human resources in the future.

United States Public Law 92-318 (40, p. 2) proposed that vocational training and retraining must be realistic in the light of actual or anticipated opportunities for gainful employment and must be suited to the needs, interest, and

abilities of the students to be served. Goldstein (32, p. 18) definitely had in mind the Federal Law when he wrote that in planning our program we must realistically take into account future employment opportunities and manpower needs.

To be able to plan high quality and effective occupational preparatory programs, which will meet future manpower needs, requires according to Goldstein keeping a sharp and constant eye on the future.

There is, however, the fear of uncertainty which many people have expressed concerning such plans directed toward meeting future needs. It is the opinion of those who entertain such fear that since the future cannot be predicted with a measurably high probability of certainty, efforts should be directed toward finding solutions to our immediate problems. In this regard, Makulu pointed out the difficulties in accurately forecasting future requirements which are necessary for educational planning. The rate of change, he said (50, p. 92), is so rapid that projections are out of date before they are implemented.

Another important problem facing technical and vocational education in Nigeria is lack of interest by students in some important job areas. For example, very few students desired to be trained in agricultural and related occupations. Various factors influence students' predisposition and attitudes toward different occupations. For instance, Osuala (61, p. 179) said that secondary school graduates feel reluctant

to engage in agricultural occupations because of the great disparity between average income in the modern sector and in the traditional agricultural sector. Quoting from the writings of Durajaye, he wrote:

> A problem that should concern Nigeria is the problem of youth unemployment. Yet it ought to be realized that the prevailing system of education is often responsible for the unemployment of the Nigerian youth.... We educate job seekers but do not train job makers. Young people are alienated from the rural areas and agricultural occupations. The schools' curricula decidedly influence pupils against farming. For the majority of the youth, farming means profitless toil.... The youths look to academic education as a means of escape (61, pp. 179, 180).

Yet another serious problem is the lack of cooperation that exists generally between vocational educators and business, industry and other employers of a technical labor force. Although the common or general contention has always been that money constituted the major setback in establishing technical training programs (in Nigeria), Lewis seems to have deviated from this general opinion. The major problem as perceived by him is purely administrative. In addition, however, the unfavorable predisposition and attitudes of employers, particularly in the private sector of industry and business were also recognized by Lewis. Hence, in describing the Nigerian situation, he stated:

> In the field of technical and adult education in Nigeria the present situation is one of inadequate facilities and of difficulty in formulating suitable policies. Except for the large industrial and commercial organizations, it has so far proved impossible in practice to obtain from the private sector of industry and commerce

> the kind of information that is essential to planned development of education. The major organizations, both government and private, still depend largely upon on-the-job training to provide their own skilled manpower needs.
>
> The attempt to establish middle-level skilled technical manpower through the Nigerian College of Arts, Science and Technology floundered..., partly because the planning of courses was carried out with little consultation with industry and commerce, and with virtually no reference to economic planning, and partly because socially and economically the prospects did not attract the products of the secondary schools (47, pp. 136, 137).

Osuala (61, p. 8) regarded the limited participation by employers in public vocational preparatory programs as the major reason behind the limited contribution Government Trade Centers have made toward industrial training.

The growth of technical education in Nigeria has been greatly limited by the restriction which facilities and staff imposed on expansion. The training facilities and equipment are so few and limited that when the Ashby Commission recommended increase in student intake into the various programs, there was no noticeable difference in student enrollment. Osuala (61, p. 208) made reference to the section on "Education and Manpower Targets" of the Ashby Commission Report and to the writings of Eicher et al. in their book "Growth and Development of the Nigerian Economy". In comparing the manpower target the Ashby Commission recommended for the country and the attainment by 1965 according to Eicher, it was discovered that the annual intake and output of the technical institutes was less than what the commission recommended. As

against a projected annual output of 5,000 technicians to be produced by 1970, the total student population in all technical institutions was 3,354. Osuala (61, p. 209) remarked:

> In order to reach the target set by the commission, technical and vocational schools would have needed to increase their enrollments to six or seven thousand by 1970.

The National Manpower Board repeatedly warned that rapid development of vocational-technical education was the most crucial problem facing the country. Narrating the comments of Professor Yesufu on the nation's need for trained technical manpower, Osuala stated that at least 30 fullfledged technical institutes and 10 colleges of technology were needed in Nigeria (61, p. 208). Thus the production of skilled manpower at the intermediate level fell far below the planned target. This trend has not changed. At the end of the 1977-78 school year, the Federal government felt that the only way to meet the country's demand for technical intermediate level manpower was to embark upon extensive overseas training. Graduates of secondary grammar schools were selected by each of the 19 states of the federation for this training scheme which would take place in the United States of America, Britain, Canada, and Germany. However, this practice has been condemned by Blyden and other African nationals when the then colonial governor Cater initiated it. In his reply to the letter of protest sent to him by Blyden and his associates, Governor Cater agreed that the practice

was a mistaken one (59, p. 54). Relying on advanced nations to provide technical training for developing countries generally fails in the last analysis because the nature of such training is designed to serve the needs of a different society and technical stage of development.

Lack of accurate data on which to base prediction is another major problem facing both the educational and economic systems in Nigeria. Prior to the start of free primary education in the country, an attempt was made at predicting the school enrollment. Describing the discrepancies between the estimated number of children predicted to enroll and the actual number that did enroll, Lewis wrote:

> In the Western region of Nigeria it was estimated that the number of children who would register for admission into the first year of the primary schools would be 170,000. In the event 400,000 did so.
>
> In consequence it has proved exceedingly difficult, and in most cases impossible, to provide accurate projections of the number of pupils to be taught, the numbers of teachers to be trained, and the number of classrooms to be built, the numbers of books required and the amount of equipment to be purchased. In every instance the estimates have been sadly short of the actual figures (47, p. 131).

Lewis also touched on the general lack of interest by the Nigerian society in technical education. The attempts to provide technical and vocational training, according to him, have not gained the interest of many people, and the status of the technician in Nigerian society is not yet such as to attract young men and women in any considerable number (47, pp. 134, 135).

Lewis was of the opinion that developing countries must evidently build their future by an unprecedented use of a planned educational system, starting often from a modest resource and partially coordinated endeavor (47, p. xii).

According to Fafunwa (23, p. 194) there is indeed no greater force for social, economic and political advancement than a good educational system realistically organized and judiciously administered with skill and insight.

With the hope of subduing the problems created by the acute shortage of skilled manpower the recent national development plan laid very great emphasis on the training of skilled labor to meet industrial needs. Obviously this is a very tremendous task. To achieve this goal, the advice of Makulu for the nations embarking on such plans must be heeded. He stated:

> Skilled manpower had to be trained and there are no short cuts in the training process which in some fields takes years.... The development of technical schools and polytechnics should be regarded as an important priority and specific targets should be set in the production of technical manpower. The fields in which training is given priority will of course depend on the needs of the nation concerned (50, pp. 96, 97).

Although such fields in which training should be given priority are still somewhat very hazy in the minds of Nigerian educators, as evident in the country's educational system where the emphasis is still on liberal studies, yet according to Ikejiani et al. (36, p. 87), the two great bases of a nation's true strength and culture are agriculture and

industrialization. He declared:

> In our onward march to nation-hood and national greatness our educational system has yet to forge a proper link between the educational system and the agricultural and industrial programmes of the country.

The type of link stressed by Ikejiani can only be achieved through a direct involvement of both industry and labor in planning, implementing and maintaining high quality training programs. Moreover, Gillie (31, p. 28) was of the opinion that increased cooperative planning between schools and the business-industrial community can reduce the chronic shortage of workers in some occupations to manageable proportions.

To ensure that high quality occupational programs are developed and made available to the general public, the Department of Public Instruction (38, p. 26) entered into a cooperative agreement with the Job Service of Iowa (JSI). Under the agreement, the JSI provided the State Board and local educational agencies with occupational information regarding present and future prospects of employment in the community and elsewhere within the state.

The Iowa Plan further stated that such information is used in providing vocational guidance services to students and in determining the occupations for which persons are to be trained and in providing such training.

Planning, Implementing and Maintaining Occupational Programs

The foreword to the text "Education, Development, and Nation-building in Independent Africa", contained the following statement by His Excellency Dr. K. D. Kaunda:

> The age of the old unimaginative approach to education is over and the time has come for all young African countries to engage in serious appraisals of their existing educational systems with a view to overhauling them entirely and gearing them to the needs of the countries concerned. As I said earlier, trained manpower is crucial in a developmental process and it therefore follows that for the overall economic planning to be assured of success it will have to be undertaken side by side with coordinated educational planning with clearly determined priorities.

To emphasize what he has so far said, Kaunda declared:

> There is no longer any place in Africa for the theoretical academician bent on researching into various aspects of man's environment which do not have much direct relevance to the development and/or improvement of man (50, p. ix).

Harbison (34, p. 9) stated that the wealth of a country is based upon its power to develop and to effectively utilize the innate capacities of its people. The economic development of a nation is ultimately the result of human effort. It takes skilled human agents to discover and exploit natural resources, to mobilize capital, to develop technology, to produce goods and to carry on trade. The same opinion was expressed by Lewis (47, p. 3) when he wrote:

> Underlying the problem of social, economic and political development is the need to develop the educational system in such a way as to provide a satisfactory flow of men and women capable of acquiring the skills necessary to

exploit to the fullest the natural resources of the country for the benefit of the community.

Makulu (50, p. 100) also emphasized the great importance of manpower planning, stating the need for accurately determining the manpower needs. According to him, both underestimation and over-estimation of requirements can have disastrous effects. A manpower forecast for any country must take into account many factors. It must consider the resources of the country, both potential and actual, and national goals and expectations. It must also take into account wastage and replacement, since in many countries the replacement of expatriate manpower is a real and serious problem.

The strategy of manpower planning

Touching on the broad topic of "Educational Planning", Makulu (50, p. 44) said that an important and basic strategy of educational planning broadly speaking is "sensitivity". Planners must be sensitive to the needs and opinions of the country and be aware of the means available to implement the plans to be made. There should also be some estimation of the results which will be produced.

Further, he added that the strategy then is to make an assessment of the manpower requirements in order to see areas in which there are serious gaps. This assessment naturally affects educational plans and the content of education as well as the emphasis and priorities of the educational system.

Makulu quoted from the recommendations of the Addis Ababa

Conference which was attended by the representatives of member countries ministeries of education. The conference considered manpower assessment as a necessary first step in the planning of educational expansion. Among other things the conference recommended the establishment within a single Ministry or in the form of an inter-ministerial commission, of manpower boards with the following functions: assessment of present manpower resources and needs both in the public and private sectors, long-range forecasting of manpower requirements, development of programmes for education and training of manpower, including on-the-job training of employed manpower.

In his abstract, Lucas (49) detailed four phases of what he called market analysis in developing a new program. Specifically, he listed as the second phase, the determination of the demand by students for specific programs. Possible methods, he added, included survey of high school seniors with regard to career preference, survey of employers in a specific field with regard to their training needs, and surveys of the adult community in general.

Fasold (26, p. 5), on the other hand, stating the important factors/requirements for the effectiveness and success of work oriented programs, wrote:

> To ensure the provision of education that is economically and socially relevant, we must establish and maintain functional, mutually supportive relationship with other sectors of the community. We must develop programs and content in close liaison with agriculture, labor, business, industry, and government. No one agency or

> institution in this complex, interrelated society of ours can solve its problems or fulfill its responsibilities alone.

The Colorado Vocational Act of 1970 (17, p. 4) outlined the criteria which vocational and technical education programs must meet in order to qualify for state funding. One of the six criteria outlined stated that vocational and technical education programs must meet business and industry employment needs which are found to exist either by local or state survey.

Similarly, the Oregon guide (26, p. 8, 9) outlined the criteria which each and every occupational preparatory program must satisfy in order to qualify for approval under the provision of the Oregon State Plan for Vocational Education. One of these criteria was stated thus:

> Occupational preparatory programs must be developed and conducted with the advice of employers and other persons having current and substantial knowledge of the occupations for which students are to be prepared. Each curriculum must be served by a separate committee or subcommittee composed of representatives from:
> (a) employers and/or employer associations and management personnel
> (b) labor organizations where appropriate
> (c) experienced, qualified workers in the occupations concerned
> (d) existing post-secondary programs involving the same or similar occupational education areas.

A necessary procedure therefore, in determining manpower needs and identifying resources, includes a community survey, which was revealed by the study of Cotrell et al. (18, p. 80) as an essential competency needed by vocational-technical education professional personnel, charged with the develop-

ment of curriculum. On the basis of their findings, Cotrell et al. listed under the category of Program Planning, Development and Evaluation, these competencies: conduct a community vocational education survey, maintain an advisory committee, plan a vocational program, and evaluate a vocational program.

Another important aspect of manpower planning is the determination of student interest. Teeple (70) said that the necessity as well as the availability of training, the appeal of the job to students and the ability of the program to train students for the job are variables to be taken into serious consideration in curriculum planning.

In the aspect of program evaluation, Matteson (51) recommended that follow-up studies should be conducted often as a means of evaluating training programs and the counseling services.

It might then be necessary to look at the qualifications recommended for persons fulfilling any or varied important roles of planning, developing, evaluating and maintaining occupational preparatory programs.

Fibel (27) reviewed the writings of some educators with a view of presenting a synthesis of their opinions on the organization, administration and other aspects of occupational preparatory programs in community colleges. Included in this review was the study of Butcher (15) which was directed at the determination of desirable characteristics of vocational department heads as seen by senior administrators. Based on

his findings, Butcher presented in a rank order a list of the desirable characteristics for department heads. The most important on his list were technical knowledge, strong background in vocational education, followed by student-centered approach and a thorough knowledge of the basic principles of learning.

Draper (20, p. 85) outlining the procedures to be followed in developing a responsible occupational preparatory curriculum said that organizations have got to be set up, information disseminated, regulations adopted, and projects, plans and allotments approved. The prerequisites for the development of the type and quality of projects and plans Draper referred to were clarified in the writing of Hanson in (36, p. 62) who stated:

> Only when the goals are set, the facts about the existing situation determined and answered and all alternatives located and examined can an intelligent plan be devised.

The first step in the procedure outlined by Draper concerned the setting up of organizations. Such organizations varied from state to state and from one country to another. Miller and Gillie (54, p. 35) explained the various organizations charged with the administration of manpower preparatory programs in this manner:

> Just as education and manpower needs vary between states, state control of post-secondary occupational education varies. In some states, post-secondary vocational and technical education may be administered by the state division of vocational education regardless of the institutional setting. In other states, such programs

> may be controlled by the regents of higher education or a special state board for this purpose.
>
> Occupational education programs in community colleges may be administered by a state board for community colleges. But in a number of states a combination of state boards or agencies operates through cooperative arrangements to administer a variety of programs in a variety of institutional settings.

In planning manpower preparatory programs, it is also recommended as a necessary first step that the number and type of manpower needed in the immediate community to be served be determined. However, according to Miller and Gillie (54, p. 35) there are certain specialized technicians or related specialists in such fields as veterinarian assistant and laboratory animal care, mortuary science, or marine technologies, where the demand for graduates in the immediate local area or state is not sufficient to employ all program graduates. These programs, they said, must serve a regional or national manpower market.

Since one of the major goals of vocational preparatory programs is to provide industry and business with adequate and well-trained technical manpower, the cooperation of industry, business and other employers of technical labor with educators charged with developing such programs is a vital prerequisite for the attainment of program objectives. In a detailed outline of the qualities or characteristics of a vocational-technical professional personnel development system, essential to the maintenance of the projected rate of program growth in Ohio, was the following descriptor:

> A program which establishes and maintains an effective and positive relationship with business and industry, local schools, and the designated State agency which is responsible for the maintenance of minimum standards in vocational training programs and vocational teacher educational programs which receive Federal funds [is essential] (74, p. 42).

If the preceding statement is accepted as valid and worthy of consideration, in designing and implementing vocational and technical educational programs therefore, some thought must be given to the roles which appropriate community groups should play in all its ramifications. Paramount in the implication of the above statement for manpower trainers is the requirement for those who are directly involved in the utilization of technical labor to provide needed input at all phases of the curriculum development process.

Discussing the training and retraining of out-of-school adults in the following passages, Smith (65, p. 39, 40) touched on several important facts concerning the interdependency of industry and schools upon each other:

> Out-of-school adults cannot be treated as a homogeneous group. Their employment skills and abilities extend from no skill at all to the highly technical.... Some in all of these groups, from the highly skilled technician to the functional illiterate, have need for vocational training.
>
> Formal apprenticeship programs are now training only about 12 percent of the skilled craftsmen; and probably due to restrictive rules and regulations, the length of the training period, and the high cost of the training to both the trainee and the employers, apprenticeship is on the decline. On-the-job training in modern business and industry may always have to provide the final training in skills in order to adapt the skills to particular needs.

> More and more firms large enough to do so are helping their employees upgrade their skills, acquainting them with more than one job, and training them for new jobs created by the introduction of new products. But the smaller firms and those without substantial research and development programs find such inside training programs difficult to carry out, and even the larger firms do not find it feasible to provide all the training that their employees must have. The training is too costly, and trainees will be lost constantly to other firms who do not have training programs of their own. Industry therefore is looking more and more to the schools to provide their employees with the prerequisites for training, all the way from training in job literacy to education in science and technology; the more advanced the skill, the more education the schools must provide. The most significant fact, therefore, is the necessity for cooperation by the schools and industry, with the schools assuming the responsibility for teaching the prerequisites for all skills and the basic elements of the higher and more technical skills, and industry assuming the primary responsibility for teaching the semiskills or lesser skills and for adapting the higher skills to particular situations. This cooperation should exist throughout the entire educational spectrum.

According to Koschler in (80, p. 27) a joint program planning guide should be developed. This guide should contain sections on manpower requirements, occupational training facilities, present operating programs, advisory and community assistance groups, available research data and such other items as necessary to demonstrate evidence of joint planning. If public confidence is to be retained, or in some instances restored, better decisions must be provided by educators in order to meet the need for occupational training.

Burt (14, p. 28) urges joint preparation of action programs by industry and education, for the recognition and motivation of students in industrial education similar to those of the Science Fairs where junior scientists are

recognized for their achievements.

Whatever form the cooperation urged between industry and education takes, the only one purpose or objective is the attainment of predetermined program goals. The participation of industry and business in formal manpower preparatory programs is usually in the form of advisory committees. Informally, industry and business undertake direct training of their own workers. In "Guidelines for Secondary Cooperative Programs Preparatory Career Education", the Iowa State Department of Public Instruction (66) describes the composition of an advisory committee as representing the occupational areas for which training is provided, and explained its functions as that of assisting school personnel in the development and assessment of outcomes of the preparatory career education.

Riendeau (62) emphasized the importance of advisory committees to help curriculum planners achieve their objectives.

The success of any training program depends to a very good extent on community support. Obtaining community support should therefore be given very serious consideration in developing manpower training programs. "The total program of occupational education within an institution needs the continuing support of the community," stated Miller and Gillie (54, p. 30). Describing how to obtain community support, they wrote:

> An excellent vehicle to gain this support is through the general advisory committee. Further, individual curriculum or individual departments need the support and consultation of technical advisory committees, one for each occupational program, which also serves to promote employer and other community support.

Beal and Hobbs (8, p. 7) pointed out that the public can be educated and convinced that a problem exists which requires their attention and action. If this is achieved, the problem becomes the "people's problem", they said.

In Nigeria, however, the Federal Advisory Committee on Technical Education and Industrial Training (23, p. 218) had a much broader role, as was evident in the following presentation of the committee's terms of reference:

1. To advise the Minister on the development and training, including the common training required to meet industrial and commercial needs.
2. To carry out an examination of technical education in the areas of:
   (a) An assessment of the number and categories of trained persons required to meet the needs of industry and commerce during, say, the next five years;
   (b) A broad indication of the nature of training required for such persons;
   (c) Recommendations to the governments concerned as to modifications necessary to existing technical institutions and additional ones required to meet the need of each area.

At the National Clinic on Technical Education, Styles (80, p. 34, 35) listed the procedures followed at Tarrant County Junior College in developing programs as:

1. Determine program needs in terms of employment opportunities and potential student interest. This is done by studying labor market data, personal interviews with potential employers, and student feedback.

2. Select an advisory committee composed of representative community agencies.
3. Determine the feasibility of developing a program with an advisory committee.
4. Perform a task analysis of the jobs to be performed.
5. Establish a sound set of objectives and job description for the program.
6. Appoint a sub-committee from the advisory committees members at large to work with appropriate college officials in designing a curriculum to meet the objectives and job description.
7. Thoroughly study available information relative to the curriculum under development.
8. Develop the specialized courses necessary to provide the skills and information peculiar to the objectives and job description.
9. Select or design the related and supporting courses for the curriculum.
10. Add the general courses which may be necessary to meet degree requirements, if a degree is to be awarded.
11. Review program proposals with appropriate state agency representatives, the local news media, and counselors of area high schools and other colleges.

Several Basic Problems and Criticism of Manpower Research

Mangum and Walsh in (77, p. 21) in their article titled, "A Decade of Manpower Training", discussed the probable results of an effective training program. They stated that an effective training program might improve the labor force and facilitate matching supply and demand sufficiently to allow aggregate economic growth policies to accelerate job creation with lessened inflationary consequences. They further contend that when there is no clear connection between training and available jobs, the result often is another frustrating experience. Nevertheless, they saw as one of the most

serious weaknesses of MDTA (Manpower Development and Training Act), the requirement (in the law initiating the Act) that training should be limited to occupations offering "reasonable expectation for employment". This requirement, according to Mangum and Walsh, together with the assessment of programs by job placement rate have together been responsible for an unduly short-run focus.

The validity of this conclusion is, however, dubious. There are many people, like Fishkind, Milliman, and Ellson (28) who would regard these so-called "weaknesses" of MDTA as the most important regulations on which depends the success of the Act.

Kaib in (79, p. 33) reported a training program set up to train workers on contract basis to meet employment needs of particular industries. The contract was initiated by the industry or shop in need of additional trained personnel or desiring to upgrade the skills of its employees. Commenting on the success of the program, William Monteith, Sr., Chairman of the Machining Association's apprenticeship and training committee, wrote:

> Many of these young people stay with their firms after the on-the-job training which makes the program attractive to young persons faced with career decisions. They know before they start that if they complete the course satisfactorily, placement in a good full-time job is the end result (79, p. 35).

Since the major goal of occupational preparatory programs is job placement of program graduates, it is therefore neces-

sary to make sure that those who went through the rigor of occupational preparation enter into employment, in occupations for which they have been prepared.

Obtaining the assurance that graduates of occupational preparatory programs will actually be employed constituted the greatest problem for manpower research. The variables which ultimately determine the number of graduates that will be accepted for employment, in occupations and related job areas for which they have been trained, are many and varied.

Such factors include the financial position of the employer, current demand for company's product, changing conditions of employment due to government regulations, technological changes affecting the nature of job performance and others.

Hence, according to Fishkind et al. (28) manpower research studies should seek to determine "effective demand" which refers to the willingness of employers to actually employ the total number of workers they indicated a need for, when these are trained.

Fishkind et al. criticized most manpower studies with implication for vocational technical education which utilized employers survey technique. Describing and criticizing the procedure, they stated:

> In the employer survey procedure, a sample of local employers is querried with respect to their present and future occupational employment requirements. This procedure has been shown to be notoriously inadequate because it does not deal with effective demands (a willing-

ness to hire) and because changing economic conditions influence the willingness of employers to hire workers.

Moreover, most of the methodologies used in predicting future manpower needs, according to them, yield spuriously high or low unreliable results. Suggested techniques included time trend, shift-share, and econometric techniques. The latter technique is the best according to them.

Their study also revealed that only three out of seven studies reviewed by them attempted any supply side analysis at all. Without some knowledge of the supply of labor by occupations, demand projections are of limited value to vocational technical education needs assessment.

Sharing the same view with Fishkind et al. are Meleen et al. Meleen et al. (52, p. 4) acknowledged the difficulty of obtaining accurate data relative to manpower research. They said, "Demand figures are often the most difficult criteria on which to obtain accurate information." Nevertheless, they strongly advised that where relatively accurate demand estimates can be ascertained, it is most important that educators are assured that employers will hire the graduates of new programs rather than drawing from the general labor market or providing necessary training on the job.

In contrast, however, Makulu (50, p. 100) regarded as an ideal, a situation where a balance between the supply and demand is achieved but remarked that such is rarely the case. Moreover, the human elements in calculations can never be

accurately predicted.

The Industrial Relations Center (IRC) of Iowa State University, and the Iowa State Manpower Development Council presented a somewhat balanced and objective view concerning occupational need surveys as evident in the following statement:

> The job vacancy survey is designed as an efficient means for obtaining highly useful and up-to-date occupational employment information. It is intended to supplement long-run forecast of manpower trends which are related to changes in technology, population distribution, and industrial structure.
>
> Complete information on occupational employment data trends requires both types of approaches. Long-run forecasts, however, take time to develop, and though valid for some future project, are subject to often rapid short-run variations. Job vacancy data, though short-run in nature, have advantages in providing an immediate and highly sensitive measure of employer skill requirements (72, p. 4).

Another flaw in existing manpower forecasting models that also was revealed by the study of Fishkind et al. (28, p. 29, 31) was that they are stronger on the analysis of the demand for labor than upon the supply of labor. Moreover, the demand for labor is often thought of as the expansion plus the replacement demand. Manpower projection models which are used to assess needs for various kinds of training programs usually assume that unmet needs (projected manpower requirements in excess of projected labor supplies in given occupations) can and should be met by training program responses.

Manpower Research and Survey Reports

The first recognized and organized effort directed at the determination of Nigerian manpower needs was made by Professor Harbinson. Harbinson, under government appointment, tried to estimate the country's need for high-level manpower between 1960 and 1970. The needs as well as the educational implications were the main focus of Harbinson's study.

Of particular significance and relevance to this study was his finding that between 1960 and 1970, the country would need 5,400 intermediate manpower, to be produced in post-secondary institutions both at home and abroad. Further, Harbinson contended according to Fafunwa (23, p. 153-155) that the services of expatriates would still be needed by Nigeria but it should be the objective of the country to reduce considerably the number of expatriates after 1970 and to replace them by Nigerian citizens.

It must be pointed out, however, that because of the great increase in the number of skilled workers still in demand, it has not been possible to reduce significantly the number of expatriates still engaged in productive activity in Nigeria. On the contrary, mostly in the private sector of the economy, there is an increase in the number of foreign nationals engaged in varied occupational activities in Nigeria.

Osuala (61, p. 176) summarized, in his study, the findings

of a labor force sample survey conducted between 1966 and 1967, which was originally reported by Gerald K. Helleinger. The result of the survey showed that nearly 40% of the country's population of about 56 million was in the labor force. Out of the 40% in the country's labor force, about 72% were gainfully employed in agriculture. A similar result was yielded by the 1970-74 labor force sample survey.

The National Planning Association (NPA) (76, p. 209) conducted a series of studies for the U.S. Office of Education. In one of the studies they reported that the future looks bright for vocational education. By 1980, the number of annual job openings for persons with entry-level preparation in mechanical crafts, construction, health occupations, and other skills taught in vocational programs was expected to be nearly four times greater than the number of people who completed such programs in 1968.

In another study, NPA (76, p. 9) found that as many as 75% of the trainees in publicly funded skill training programs in some cities were preparing for similar occupations--office work, low skilled health occupations, auto mechanics, electrical work were among the most common.

The question of whether these people will get jobs could not be resolved, as the study revealed that 15% of all enrollees in the 20 cities studied were heading for occupations that already had a manpower surplus.

Coordination and communication among occupationsl

training programs needs much improvement according to NPA.

The Engineering Manpower Commission for Engineers Joint Council (21) published the results of a survey titled, "Demand for Engineers and Technicians in 1966". The 100-page report was based on questionnaire response by 490 organizations which in 1966 employed 183,000 engineers, 74,000 technicians, and 40,000 physical scientists. The survey yielded the following results:

1. A growth in technical employment of a little over 3% is envisioned by employers. The demand for graduates of formal courses of two years or more is particularly strong, but the supply is also expected to increase substantially in the next few years because of the rapid proliferation of two-year colleges.
2. Recruitment of technicians and trainees for technician programs was more difficult than a year ago, but not as much as for engineers.
3. Employers expect an increasing proportion of their technicians to be graduates of technical institutes and the ratio of technicians to engineers to increase. They also plan to train more technicians in-house.
4. The electronics and electrical industry show the greatest increase in technician employment in 1965 and 1966, and indicates strong growth in the decade ahead. New graduates and experienced technicians were very difficult to hire in 1966. Continued growth through both hiring and upgrading is envisioned.
5. Future growth in technician employment in the machinery field is expected to be high, with good opportunities for technical school graduates as well as trainees.
6. Technician employment grew even faster than that of engineers between 1964 and 1966. The chemical and electronics industries were the greatest gainers, with increases each year between 22 and 25%.
7. Between 1965 and 1976, it is estimated that the total national employment of technicians will grow by 36%, or an average of 3.3% per year.

Bessire (11) tried to determine the extent to which the vocational training program at Shasta College, Redding,

California has been responsive to the needs of its community and to certain expressed interests of its students. The data gathered from over 90 labor leaders and employers in the community sought to answer the question of whether the college training programs were based on the existing training demands, and in which field was the demand for trained personnel not satisfied.

To adequately answer the first question, Bessire also conducted a follow-up study of the graduates of Shasta College. He seemed satisfied when he found that the occupational training needs of the community and the interests of students were the obvious concern of the college. Existing programs were based on job opportunities in the community.

Further proof of orientation of training programs to local community needs came from the follow-up study which showed that the majority of the college graduates found employment directly related to their training.

Quoting from the report of Walter J. Brooking, titled "Establishing Priorities for Postsecondary Energy-Related Technology Programs", Moore (55, p. 4) wrote:

> The number of technical workers in energy-related industries will increase from 135,000 in 1974 to 185,000 by 1985 at a rate of 5,000 a year, according to Shell. By 1985, about 13 million new jobs will be created in the nation's work force, with about a half-million of these jobs growing out of investments by the energy sector. Half of the new jobs in the energy sector will be operating and maintenance jobs and should be necessary for the life of the particular facilities involved.

The Texas project (71) conducted from July 1974 to

December 1976 was to complete the research of statewide matching of supply by occupation (those available for employment) to demand by occupation (employment opportunities).

Following the results of the study, the authors concluded that a great need exists for better data definition and collection systems, and that an ever increasing necessity for supply/demand data mandates continued manpower data research. Such data would be used by planners and others who are involved in the allocation of educational resources.

The problem facing Texas which necessitated the study was the nonavailability of accurate data by occupation to ensure the most effective utilization of Federal, State, and local funds expended for training programs in vocational education. No system was available to relate manpower requirements by occupation to the projected number of students who are in public and private vocational training. Quoting from a publication by the Advisory Council for Technical-Vocational Education in Texas, the authors wrote:

> There is no one publication or central location at the local, state, or national levels where people can determine through one phone call the projected number of jobs for a given occupation, in a given area with attached information as to the projected number of people training in that area to fill those jobs (71, p. 3).

Tyler and Fisher's (73) research project was developed to identify the jobs and training needs for the area of wastewater land treatment systems and related agricultural occupations. The report presented a detailed analysis of the

projected needs, which revealed the number of workers required in various areas of agriculture such as production, supplies, mechanics, and ornamental horticulture between 1974 and 1979, and the number being trained in each area.

Based on their findings, they recommended the development and implementation of educational opportunities that would provide relevant training in agribusiness, natural resources, and environmental protection.

The study of Lecht et al. (46) sought to expand occupational information available to educators by relating job openings data to information about the earnings of persons employed in different occupations. One hundred and twenty-three occupations in the area of federally sponsored vocational programs were included in the study. The report presented projections to 1980 and 1985.

The research indicated that vocational enrollment had become more labor market oriented. However, there was a high ratio of enrollments to anticipated job openings in the agricultural fields, and a low ratio in the health and distribution fields.

Job openings, based on the projections, were considered as the average annual job openings in the 1970 to 1985 period. Two components in the average annual job openings were: employment growth and attrition. An average annual average was used since it was considered misleading and probably inaccurate to estimate job openings in a single year given the

fluctuation in the business cycle.

In 1965, Boyle (12) carried out an investigation of the procedures utilized in planning occupational education programs in selected junior colleges in Florida. The purpose was to identify procedures which could have generalized applications in that regard. To make possible a better coverage and treatment of the problem, Boyle further divided the topic into three main categories: (1) the procedure utilized in assessing the need for occupational education, (2) procedure used in planning courses and curricula to meet the assessed need, and (3) the procedures used in evaluating on-going programs of occupational education. Selected findings of the study included:

1. The growth of junior college occupational education in Florida and the rising levels of success enjoyed by graduates of these programs indicated that occupational education at the junior college level provides a needed service to local communities and to the state.
2. The development of procedures for the planning of junior college occupational programs required extensive cooperation among and between state agencies and individual junior colleges.
3. Junior college vocational-technical advisory committees have made important contributions in all areas of planning in junior college occupational education. There appeared to be some advantage in having representation on these committees from a number of different levels (management level, supervisory level, personnel level, job level) and from both small and large industries.

Boyle outlined four research areas to be emphasized in planning work-oriented programs and curricula:

1. Periodic (every 5-10 years) statewide studies of

occupational need.

2. Continuing less formalized studies of occupational need in counties served by junior colleges to update information provided by periodic state studies.
3. Studies of selected occupations.
4. Follow-up studies of employed graduates.

In 1965, Anderson (4) conducted a study to determine the needs for additional post-high school occupational training programs in the San Luis Valley of Southern Colorado. On the basis of his findings, he recommended expansion of high school vocational programs, especially in the area of cooperative work projects with local business and industry; and the establishment of an institutional program with greater flexibility in admission to include high school students, dropouts beyond 18 years of age, and adults for occupational training and retraining.

Burns (13) set out to investigate the conditions, the principles, and the practices under which area vocational-technical programs have been established and operated in the United States and to apply the findings to the State of Missouri.

The data obtained from 50 state directors of vocational education and 465 local directors of area vocational technical schools and programs in 42 states revealed that research studies designed to obtain local employment potential and to secure enrollment in the area served by the vocational school

or program were the most beneficial and most frequently conducted. In addition, Burns found that a minimum of from three to six occupational areas would be desirable in establishing an area vocational-technical school or program.

Looking at the factors that would contribute to the successful operation of the program, he found that approximately three-fourths of the industries in the geographic service area should support the area vocational-technical school or program, two-fifths of the potential students in the service area should be interested in such programs, and approximately three-fourths of the voters should favor such programs.

The study of Scott (63) sought to determine the possibility of establishing an area vocational school to serve five northeastern Missouri counties. The questions to which he sought answers included these:

1. In what occupations were the former high school students of the five county areas employed?
2. What was the extent of potential student interest in vocational courses that might be offered to meet the manpower needs of the labor market area?
3. What were the employment possibilities of vocationally trained graduates in the five county area?

From the data collected from records on file at the Missouri State Department of Education, the Missouri Employment Security Division, the office of the superintendent of the twelve schools studied, questionnaire response by 556 former students of the participating schools, voters, and

eleventh and twelvth grade students, he found that less than one-half of the former students found their entry job within the local market area. Approximately 38% found jobs in the state, and approximately 20% secured their first time employment outside the state of Missouri.

He also found that less than one-half of the former students had made an occupational choice before leaving high school; and one-third of them had an interest, at the time of the study, in securing vocational training related to their occupation. Of the 1598 eleventh and twelfth grade students, 55% had also made occupational choices for which they desired training.

Over 75% of the high school male students indicated an interest in the proposed vocational course offerings, with automechanics, agricultural business, electronics, and drafting design, in that order, attracting the greatest amount of interest. Of the female students in these grade levels, 70% and more indicated interest in secretarial practice, practical nursing, bookkeeping and accounting.

Of very important implication to educators was his finding that the vocational interest of male and female students were not in close alignment with the unfilled job opportunities in any of the five county areas.

Less than 1% of all the 622 voters sampled were against the establishment of an area vocational school. Scott's study favored the establishment of an area vocational school which

he recommended.

Kennedy's manpower survey (44) sought to determine current and future manpower requirements and relate them to the occupational skills needed in the vocationa-technical training programs. Data were obtained from employer respondents through a mail questionnaire sent to nearly 1,800 firms with a return of 500. From the data collected and analyzed, the Lafourche Parich manpower needs and occupations requiring less than four years of college preparation were determined.

The result yielded by the study indicated that employment was on the increase in Lafourche Parish. Based upon employers estimates obtained in the study, expansion would continue, creating approximately 1,380 new jobs in 1973, with a cumulative total of nearly 3,700 by 1975. Jobs which will result from new industries moving into the area, and jobs made available due to deaths, retirements, out-migration, and so on were not included in the estimates.

By 1975, skilled occupations will engage the largest number of workers. Shortage of qualified employees was greater than the number requiring in-school vocational training.

The three comprehensive high schools in the area are not currently filling the demands of business and industry for skilled workers due primarily to budgetary limitations and a previous lack of exact data. All programs currently being offered needed expansion and development if they were to meet

the Parish demands which are growing at an annual rate of 6.7%.

To solve the problem of shortage of teachers and inadequate training of agricultural teachers, Okorie (60) recommended the establishment of in-service training programs, seminars, workshops or conferences to meet the manpower need. Following the result he recommended that the school of agriculture should continue to develop and enlarge programs for farmers. Moreover, the University of Nigeria should provide educational programs for the training of young farmers.

Applegarth (5) studied the relationship between vocational education in Columbia County, Oregon and employment opportunities in the area. The study was limited to five high schools vocational programs. He analyzed the enrollment trends and curriculum changes in each of the five schools. On the other hand, Applegarth took what he called a representative sample of business and industrial firms and studied the entry occupations.

In order to ensure full coverage of all the occupational areas, the author used both the "Standard Industrial Classification Manual" and the "Dictonary of Occupational Titles" in listing job titles.

On the basis of the existing trends in manpower demands in each of the job areas, he was able to make employment projections covering a five-year period from 1965 to 1970. From the analysis of his data, he found that all occupational areas will increase within the next five years. The range of

increase by broad occupational groups is from 17% to 31%, with the greatest increase occurring in the clerical, professional and sales occupations. The lowest rate of increase was found in the semi-skilled and unskilled occupations.

The largest specific net training need for the period was found in the areas of clerical, sales personnel, truck drivers and automotive repairman. The occupational forecast for Portland, Oregon shows a need for more than 78,000 additional workers by 1969. A large number and variety of individual occupations was anticipated for the Portland area in the immediate future for which high schools and/or area vocational schools can reasonably offer vocational training.

He also found that at the current enrollment trend, Portland high schools will not be able to meet the anticipated labor demands. Some discrepancies were found to exist between school and business/industry. For example, only 15% of the county youths are enrolled in programs offering preparation for the many occupations in the industrial fields where the largest number of workers were employed and where the demand for trained workers was greatest. About 26% of the students were enrolled in business and office courses which employed a much smaller percent of workers. Sales and distributive occupations accounted for 5% and 8% of the employment, respectively; the schools, however, offer no training in these areas. Agriculture provided employment for only 9.3% in the county area and 3.4% in the Portland area, while 12.3% of the

students were being prepared for agricultural employment.

Langerman (45) surveyed, using mailed questionnaires, 3,751 employers who employed four or more workers in the Area XI Community College District in Iowa. Of the 3,687 small and intermediate employers, 1,369 or 36.5% returned their questionnaires. Out of the 64 large employers who were surveyed by personal contact, 51 (79.69%) responded.

From the data received, he computed the number of workers needed in each major occupational area, classified according to the proposed training programs in the Area XI community college. The findings revealed a need for a total of 6,849 trained workers by September 1968 and 16,383 by September 1970.

The greatest need for trained workers was found in the area of office, followed by manufacturing and industrial, and construction occupations in that rank order. Apart from General Clerical (923 by September 1968 and 2,411 by September 1970), and General Accounting (368 by September 1968 and 1,049 by September 1970), the greatest number of trained workers needed in a single job title was in the area of Carpentry where 450 trained workers were needed by September 1968 and 890 by September 1970.

There were 1,314 persons participating in formal in-plant training by 1967. The number was projected to decrease to 923 by September 1968 and to 996 by September of 1970.

Based on the number of workers needed by employers by September 1970, Langerman recommended the establishment of

training programs in these areas:

1. Secretarial
2. Clerical
3. Bookkeeping
4. Carpentry
5. Marketing and Sales
6. Welding--oxy-acetylene, arc and heliarc
7. Keypunch operator
8. Automobile mechanic
9. Programmer (data processing)
10. Punch card accounting
11. Nurse aide
12. Tool and Die making
13. Nurse (associate degree)
14. Food Service
15. Masonry

The study of Scott (63) showed that 23% of the workers in the five Missouri counties were engaged in agricultural and related work, and the remaining 77% in nonagricultural occupations. He also found that home economics had the largest enrollment of vocational students, followed in rank order by vocational agriculture, and trade and industrial education. He found one program which was particularly being sponsored by industry.

Approximately 23% of the former students secured entry jobs in clerical and kindred occupations. One-fifth entered occupation as service workers and an additional 13% entered as operatives and kindred workers.

Under the Rural Development Act of 1972, funds from Iowa's Title V Project (42) were made available to the Cooperative Extension Service at Iowa State University to study the population trends together with the social and economic characteristics of five areas in the state. In the area of

employment, the study revealed a total increase by 8% during the 10-year period from 1960-1970. All four counties within the area experienced employment increase during the period. However, in the area of agriculture, the number of farms within the area declined during the period, resulting in fewer farm families.

In contrast to the economic changes in the Burlington area, Marshalltown (43) had 10.8% total employment increase within the same decade, but with a greater decline in agricultural employment. All industries, except transportation, communication and utilities, experienced increased employment. The most significant increase occurred in manufacturing.

The greatest employment increase in the four study areas occurred in the Davenport, Iowa area (68). While total employment in the entire state increased by 8.6%, the total employment in Davenport increased by 18.8% within the same period. As in the other areas, the number of farms and farm families declined by nearly 1,200 or 20.5% as larger farms appeared on the scene.

In Region V, they (67) found that a larger percentage of the work force work outside their county of residence.

Meyers' study (53) sought to determine the number and kind of semi-skilled, skilled, and technician workers that will be needed by employers with implications for curriculum planning. Using the same method employed by Langerman (45), Meyers surveyed 13 occupational areas covering 2,242 employers

who employed four regular workers. But he received a total response of 755 or 33.68%. One hundred and thirty-three large employers were surveyed through personal contact, and 117 of 88% of them responded.

From the data collected, he found that 5,870 trained workers were needed in the area by January 1969, and 15,160 by January 1971. The greatest need was found to be in the areas of office, health, food service, and construction occupations in that rank order. The anticipated employment growth by January 1, 1969, over September 30, 1967, was 3,905 employees or an increase of 7.12%. When the anticipated employment was extended or projected to January 1971, a continued growth represented by an additional 7,546 workers or 14.30% over September 30, 1967 was expected.

Current job vacancies totaled 1,143 or 4.05% of the employed workforce as of September 30, 1967. In-house training programs were found to be common in the area surveyed, and about 1,597 employees were expected to complete training by September 30, 1967. The projected need for trained employees in the semi-skilled, skilled, and technician level jobs was 3,112 by January 1969, and 5,705 by January 1971, which revealed a definite need for trained employees. Fifty percent or more of the employers who responded, indicated that trained workers were in short supply in 106 out of 306 job titles.

Based on his findings, Meyers recommended 20 vocational-technical program areas based on the number of employees needed

as of January 1969, and 31 programs to train workers for the 1971 job market.

A study of job characteristics of automechanics in selected Iowa dealerships and garages was conducted by Drost (21). The study was designed to provide data relevant to automotive repair and service field and to provide facts for planning course content and curriculum in automotive mechanics.

Results of this study indicated that 60% of the automotive service personnel employed in the shops surveyed were general line mechanics. Only 30% were specialists in one particular area. The most utilized form of training before entering the trade appeared to be training in the military, high school, and trade school automotive programs. He also found that employees in automotive workshops sought additional training, to upgrade their skills, in company training schools and in their apprenticeship programs.

Sixty-three percent of the 40 service managers interviewed indicated a desire to employ graduates of post-secondary automotive training programs as general line mechanics.

Based on comprehensive and thorough review of appropriate texts, conference reports, National Development Plans, and other related writings relevant to Nigerian Educational System, Osuala (61) reached the following selected recommendations:

1. Every secondary school in Nigeria should have at least one staff member who is competent in vocational guidance. Such a guidance specialist should help

students select not only courses tailored to their vocational needs, but also occupations suited to their future careers.

2. Steps should be taken through the Ministry of Education to authorize school administrators to establish placement centers for the purpose of placing technical and vocational graduates into entry level jobs according to the training which they have received.
3. A periodic follow-up study should be conducted (possibly every two or three years) to ascertain the schools effectiveness in preparing individuals to meet the needs of business and industry.
4. Nigerian industries should be closely associated with technical education by participating actively in policy-making, manpower planning, curriculum development, provision of opportunities for industrial experience and consultancy service.

Criteria for Establishing Preparatory Programs

The Florida study of vocational technical education was motivated by various objectives including the establishment of criteria for establishing vocational training programs. The rationale, which necessitated the specification of such criteria was expressed in the following words:

> Each curriculum requires at least one instructor with specialized qualifications and calls for expensive

> Facilities appropriate to that curriculum alone. Investments for such courses cannot be justified unless there are sufficient numbers of capable students who desire each occupational objective, and sufficient employment demand for the placement of graduates (28, p. 4).

In their definition of "Primary Training Needs Areas", the Department of Public Instruction, Iowa (39, p. 1-2) wrote:

> Occupational areas (usually a cluster of similar specific jobs) in Iowa, with a significant net demand (supply less demand) for workers which require specialized training of less than a baccalaureate degree.

This definition was preceded by the following detailed specifications of the criteria for identifying primary training needs areas:

1. Training area presently being served in Iowa--where available data indicate:
   a. A statewide need for workers which exceeds the supply of individuals with specialized training in this occupational area by 15 percent, and
   b. Information regarding projected enrollments establish a statewide need for two or more new sections (standard section size).
2. New training areas in Iowa--where specialized training has not been provided by Iowa's secondary or area schools, and available data indicate:
   a. Statewide need for workers requiring specialized training which exceeds the supply by 10 percent, and
   b. Projected enrollments establish a statewide need for two or more new sections (standard section size).
3. Emerging occupations in Iowa--where a new occupational area is emerging, and available data indicate:
   a. Statewide need for workers requiring specialized training which exceeds the supply by 5 percent, and
   b. Projected enrollments establish a statewide need for one or more new sections.

Meleen et al. (52) won a research contract to undertake

a study to develop a guide for identifying and planning for new and emerging occupations. The study led to the establishment of the following criteria for developing curriculum at the National level:

> In order to justify expending resources to develop curricula at the National level, there should be estimated demand in the identified occupations plus projected growth in demand of at least 2,000 jobs per year in each occupation over the next five to ten years.
>
> Moreover, they specified that jobs which do not require more than two months of retraining to upgrade employee already trained in related areas, or six months of training in the case of new employees, should be excluded. In these cases, on-the-job training or apprenticeship might be the more appropriate method of training.

Summary

The review of literature yielded the following important and relevant information.

1. The development, implementation and maintenance of occupational preparatory programs must be the joint effort of school, business and industrial personnel, state education agency, and other important and appropriate community groups if training programs are to be of high quality.

2. The services of an advisory committee, which must be composed of members representing all occupational areas in which the school offers training, curriculum experts, important and appropriate community groups, and school personnel, are most beneficial in the areas of program evaluation and improvement.

3. The main determinant of occupational preparatory program success is industrial support.

4. A necessary procedure for establishing job preparatory programs included occupational survey to assess employment opportunities, employer support, and student interest.

5. To establish an area vocational-technical school or program, training needs must be established in at least three to six occupational areas, and projected enrollment must be sufficiently large before investment can be justified.

6. The goal of vocational-technical education which distinguishes it from other educational programs is its manpower orientation. Student enrollment is increasingly becoming determined by the demand of the labor market.

7. The reason often given why public vocational and technical schools are not meeting the demands of business and industry for labor, included lack of precise data, lack of cooperation and involvement by business and industry in program planning, and budgetary limitations. There is a general lack of accurate and precise manpower data on which to base training program decisions.

8. There is a general shortage of skilled labor as evident in most of the studies reviewed.

9. The greatest projected number of workers was often found in the occupational areas of manufacturing and industrial, office, and construction.

10. For projecting job openings, an average annual

concept was used since it would be misleading and probably inaccurate to estimate job openings in a single year, given the fluctuation in the business cycle.

11. In most of the studies, clerical and office jobs were often found to be the greatest employer of technical graduates, and also, had the greatest percentage growth. The lowest rate of increase was more often indicated for semi-skilled and unskilled occupations.

12. The decline in the number of farmers and farm employment was attributed to increase in farm size due to mechanization which made small farming uneconomical.

13. The majority of vocational education offerings in public vocational schools was in the areas of trade and industrial, home economics, agriculture, and business and office education (not in a rank order).

14. Manpower studies which failed to ascertain "effective demand" were criticized and considered inadequate for planning manpower training programs. Nevertheless, most of the state guides and manpower surveys which were utilized for planning work oriented programs did not determine "effective demand".

A tremendous amount of work has been done in the area of manpower research. Nevertheless, there existed still a gap which must be filled before manpower research results can be readily and directly utilized in planning and implementing occupational programs. There is a lack of a tested and well-established procedure or technique for relating manpower

demand to supply which must have led to the imbalance in manpower research studies.

Most of the research efforts were directed at the determination of manpower need (demand) with implication for training. The limitations of such studies which attempted only the demand side, have consequently resulted in such criticisms that unless some attempts are made at determining supply and relating supply to demand as to obtain a net demand, demand figures served limited purposes, particularly in making decisions concerning manpower training.

CHAPTER III. STUDY DESIGN

The methods and procedures employed in collecting and analyzing the information sought in this survey are described in this chapter. For purposes of organization and thorough understanding, this chapter was divided into six main sections. Sectional headings included:

1. Factors studied
2. Selection of sample
3. Development of the instrument
4. Collection of data
5. Analysis of treatment of data
6. Description of the manpower prediction model
7. Criteria for recommendation concerning training programs.

Factors Studied

The questionnaire contained five key factors which constituted the focus of the study. These factors were the current number of workers employed in the categories of skilled and technical labor; the present status or position of trained technical manpower in Bendel State, checked by employers as short, adequate or surplus; the anticipated number and type of trained workers that would be in employment by 1980 and 1982; and the projected number of skilled and technician-level workers that would be needed by 1985. Moreover, to

make possible any recommendation affecting the existing vocational-technical training programs, a comparative analysis between the manpower demand and supply in the state by job titles was made.

Population of the Study

The population of this study was made up of employers of skilled and technical manpower in the seven occupational areas of agriculture; mechanical; construction industry; manufacturing; printing, publishing and allied industries; service industry; and business and office, in all 14 divisions in Bendel State. All public and private employers in the cities of Benin, Warri, Sapele, Agbor, Asaba and the major Divisional Headquarters which had at least 10 regular employees on their payroll, and whose businesses were listed in the government directory, were included in the study. The population also embraced all the agricultural stations in the state.

However, had the number of employers who satisfied the above criteria exceeded 300 by over 50 or more, a random but representative sample of 300 would have been taken using the table of random numbers. A comprehensive list containing the names of these industries and employers was compiled from a detailed list obtained from the Statistical Division of the State Ministry of Economic Development. Since the number of employers including the state government ministries, who satisfied the above criteria, was found to be 253, all of them

were included in the study.

Industries and employers as classified previously were listed in accordance with the Standard Industrial Classifications. Industries and employers were listed by their major project or nature of business, and those that did not fit into the six out of twelve classifications chosen for this study but whose products or activities were considered relevant to the intent of this study constituted the seventh occupational classification--business and office. The employers in this group employed mainly office personnel.

The other section of the population embraced all the principals and department heads of the five public vocational-technical schools in the state and the in-plant training schools organized by the different industries. Included in the second category was the school of agriculture at Anwai in Asaba. Apart from the school of agriculture, the other occupational training institutions have various departments, such as mechanical or automobile engineering, civil engineering, telecommunication engineering, and business and office education departments. Approval was given by the State Ministry of Education for five additional vocational institutions to be established in the state. The programs of these vocational institutes were designed to equip students with occupational competencies which will enable them to function at the level of semi-skilled workers. Some of these institutes were operational while others were not due to limited

financial support by the state government and lack of enthusiasm by the local community. Those five-year institutes which, hopefully, would start to graduate semi-skilled workers after June 1982 were not included in the study.

Development of the Instrument

The instrument which was used in this study consisted of two separate questionnaires, since the needed information was obtained from two separate population groups--industries and other employers of skilled and technician workers; and the vocational-technical institutions in Bendel State of Nigeria.

The instrument that was used to collect manpower information from industries and other employers consisted of seven separate questionnaires (see Appendix A). These seven questionnaires were among the sample instruments used by Philip Langerman in Area XI Community College Survey and Larry D. Meyers for Iowa Western Community College District Area XIII including Douglas and Sarpy Counties of Metropolitan Omaha, Nebraska Skilled Needs Survey with Implications for Vocational-Technical Education. In order to adapt the instrument to the unique nature of this study that was conducted in Nigeria, some minor alterations and adjustments were made to the original instrument as it was used in the studies of Langerman and Meyers. There were some job titles, for example, in the original instrument which were not available in Nigeria.

All the questionnaires contained the same headings. Two

sections are very easily identified if one examines the instrument. They are: the general or introductory section which required employers to indicate the total number of persons currently employed, their anticipated total employment by March 1980 and March 1982, business name and description by product or activity, business location and also to check the grade or level of manpower--skilled or technician.

The other section of the instrument which is presented in tabular form is contained in the main body of the questionnaire. This section was designed to obtain from employers statistical information concerning: (1) their previous number of employees in (2) 1974, (b) 1975, (c) 1976, and (d) 1977; (2) their present number of employees from (a) public vocational-technical schools, (b) apprenticeship training programs, (c) in-plant training programs, and (d) other countries; (3) their current number of vacancies requiring trained workers; (4) their projected employment (total number of workers) by March 1980 and March 1982; (5) the percent (of employees) leaving employment due to death, resignation, retirement or promotion (per year); (6) the current number of people undergoing training; (7) the number expected to complete training by 1978, 1980, and 1982; and (8) to check the availability or supply of trained workers as 1. short, 2. adequate, or 3. surplus. The above information was furnished by job or occupational titles. The Dictionary of Occupational Titles code numbers were provided by the researcher for analysis

purposes.

Each questionnaire listed, according to the Dictionary of Occupational Titles (DOT), code numbers for the job titles most often found in each of the seven occupational categories. A detailed description, to enable respondents to thoroughly understand the job titles, was attached to each employer's questionnaire. The number of job titles in each of the seven occupational areas included in this survey were as follows:

Agricultural related	30
Construction	29
Manufacturing and industrial	41
Mechanical (automotive) and diesel	20
Printing, publishing and allied	16
Service	12
Business and office, including government	31
	179

(Refer to Appendix B for the explanation of the specific job titles used.)

Each employer was asked to enter the number of employees in each job title category which they employ workers or desired to employ if trained workers were available.

The second questionnaire which was filled out by principals and heads of departments of the public vocational-technical schools, also contained two sections. The general section was designed to elicit information about the type of school, location, department, title of person completing questionnaire, and level at which specialized training was provided. The second section which had seven columns sought specific data on the present number of students, and the number of students expected to have graduated by June of 1978,

1979, 1980, 1981, and 1982, by occupational area.

The questionnaire for the vocational-technical schools listed training areas (occupational categories) according to the "Guide to Structure and Articulation of Occupational Education Programs" in 1968 from the State of Oregon. High school and community college cluster curricula and the number of occupational categories suggested for each curriculum were listed in the guide. The number of occupational categories selected under each technical cluster was as follows:

Agriculture	11
Construction--Building and Roads	10
Electrical Occupations (including Electronics)	9
Mechanical	8
Metal Working	9
Business/Office	
Secretarial	6
General Clerical	5
Bookkeeping and Accounting	6
	64

(See Appendix A for a comprehensive listing of occupational categories under each occupational cluster.)

Collection of Data

Because of the limitation imposed on the study by time and the cumbersome mailing system, the questionnaires were not mailed. The questionnaires were distributed by the researcher to the different industries and employers of skilled and technician workers in the state.

During the first visit with each employer, the objectives of the survey were explained briefly and the resulting questions were answered. Before leaving an employer to complete

the instrument, he or she was requested to read through the instrument and ask for explanation of parts that were not very clear to him/her. The date for the next visit to pick up the completed questionnaire was then confirmed. Direct contact with the largest employers had met with great success in the Area XI Community College Survey. The same method was adopted by Meyers in Area XIII survey.

The industries and other employers were visited the second time according to the previously sheduled date to collect the completed questionnaires. However, there were some employers who could not complete their questionnaires. Another date for collecting them was arranged. Some employers were visited four times or more, yet could not complete their questionnaires. They, however, promised to mail them within the next two months. To these employers, a follow-up letter was written, and only seven responded bringing the total response to 143.

Analysis or Treatment of Data

The information collected was tabulated. In order to do this, the questionnaires were first sorted into two groups--the industries and other employers questionnaires and the public training schools questionnaires. The industries/employers questionnaires were further sorted into the seven occupational groups. The responses were then tallied and tabulated.

Because of the relationship existing between some of the job titles, it was considered necessary to do further grouping. Hence a group of job titles were analyzed jointly. Some of the job titles that were jointly analyzed on the basis of very well-defined relationships existing between these job titles were: concrete foreman, concrete batching and mixing foreman (which were grouped as concrete supervision); concrete mixer operator, concrete paver operator, concrete paving machine operator, and concrete mixing truck driver (were grouped as concreting machines operator); heavy equipment operator (operating engineer), bulldozer operator, dragline operator, and power shovel operator (were grouped as heavy machines operator) under construction occupation; secretary and stenographer (were grouped as general secretary); transcribing machine operator, clerk typist, receptionist, duplicating machine operator, telephone operator, and general clerk (were grouped as general clerk) under office occupations. Similar groupings were done in other occupational areas to expedite analysis.

The grouping was also necessitated because of the similarity in training requirements in job titles. However, it should be noted that grouping was done strictly according to the two groups or categories of skilled and technician manpower surveyed.

Similarly, the responses or information gathered from the training institutions would have been analyzed on the basis of

two categories or levels of manpower and according to the occupational areas. But this was not possible. It was discovered during the study that the public vocational-technical schools in Bendel State train students only at the skilled level.

The data collected were tabulated and coded, using the Dictionary of Occupational Titles code numbers, onto IBM coding sheets and keypunched onto IBM cards and processed; and the computer printout was obtained.

To determine the total number of trained personnel required in any job title or group of job titles, the following equations were used.

Number required to be trained by[1]:

1. 1978 = (13 + 14) - 19
   = expatriates plus vacancies minus supply.
2. 1980 = 15 - (10+11+12+13) + 17 (10+11+12+13)2 - 20
   = expansion + replacement - supply.
3. 1982 = [16 - 15] + [17(15)2] - 21
   = expansion + replacement - supply.
4. 1985 = [(predicted employment) - 16] + 17(16)3 - 0
   = expansion + replacement - supply.

---

[1]Figures in equations are code numbers used in the survey instrument, with the exception of 2, 2, and 3 in equations 2-4. 2 in equations 2 and 3 = number of years between 1978 and 1980, and 1980 and 1982. 3 in equation 4 = number of years from 1982 to 1985.

In order to make possible a comparative analysis between the training needs and how the training programs are responding to these needs, a chi^2 test of significance was run at .05 and .01 levels. A significant difference between the two sets of data indicated a need for additional training (expansion of the training program) or an overproduction of trained personnel. The following formula was used:

$$X^2_{df=1} = \frac{[\text{Obs.} - \text{Exp.} - .5]^2}{\text{Exp.}}$$

Obs. = observed value (program responses)

Exp. = expected value (net training need)

.5 = correction factor

df = degree of freedom

Moreover, percentages were calculated for the raw data and used in reporting the findings. From the raw data, projections were made reflecting the need for trained workers and specifically depicting the number of trained workers needed by job titles, as of March 1985, using the GLM.

In summary, therefore, the analysis of data furnished information according to the following pattern which satisfied the objectives of the study:

1. A list of job openings matched with current training programs.
2. A list of job openings in (occupational) areas where no training programs were currently offered.
3. A list of training programs where there is an

overproduction of personnel.

4. A list of job titles where there is no need for additional trained personnel.
5. A list of job titles or occupational areas in which expansion of the existing training programs is necessary.
6. A list of job titles in which there will be no need for expansion of the existing training programs.

Description of the Manpower Prediction Model

A major objective of this study was to obtain accurate and reliable manpower data on which to base decisions concerning training program development. The planning of training programs cannot, and should not, be based on only current manpower needs but also be concerned with projected needs and labor fluctuations. One reason for observing this point of view is that the planning and implementation of any manpower development program involve various factors, considerations, and procedures which consume considerable time and resources. Hence, by the time the program is finally implemented, various changes might have occurred, and consequently make the program inadequate. For instance, there could be a substantial increase in manpower needs over the program development period, that would necessitate an expansion of the program by the time it is finally implemented.

Hence, it becomes necessary to be able to project

realistically into the future what the manpower needs would be and the graduates available within the different program areas. Various statistical (prediction) models have been utilized for similar purposes in diverse occupational fields. For the purpose of this study, the General Linear Model (GLM) was utilized, after obtaining the manpower trend in the state between 1974 and 1982, to predict the manpower needs by occupational group by 1985.

The GLM as a statistical tool finds ready and very wide application in solving both simple and multiple regression problems. The model is used for solving problems which involve simple or multiple variables. Based on the purpose and the nature of the problem under study, the model can be used to predict one or more dependent variables from the independent variable(s).

Using the GLM projection methodology, the researcher had many options available to him. Depending on what he wanted to accomplish, he can use any of the options, or a combination of them, to obtain parameter estimates and the associated statistics.

For the purpose of this study, the following model was used:

$$Y = b_0 + b_1X$$

Y - the dependent variable, represents the number of manpower in each job title or group of job titles.

X - the independent variable, represents year.

b_0 is the intercept of the regression line.

b_1 is the slope of the regression line.

A combination of P and CLI options were used with the model to obtain the observed, predicted, and residual values for each observation that does not contain missing values for independent variables; and the confidence limits for the predicted values.

This model assumes that the linear trend applied. That is, the number of manpower employed or needed in each of the occupational areas or job titles increases at a fairly uniform rate over the years.

Criteria for Recommendations Concerning Training Programs

To recommend expansion or retrenchment of an existing training program, there needed to be a significant difference, at an α level of .05, between the training needs in the particular occupational area or an aspect of the occupation, and the number of people expected to complete training in that occupational group, from the public vocational-technical training program.

Establishment of new programs was not recommended unless the number of trained personnel, distributed over the four-year period, exceeded 90 annually. This was considered necessary in order to justify the expenditure for providing the training programs.

CHAPTER IV. FINDINGS

The problem of this study was to determine the current number of workers, both skilled workers and technicians, and the projected number that would be needed in Bendel State of Nigeria by 1980 and 1982. The study focused on the demand for trained manpower in both public and private sectors in the occupational areas of: (1) agriculture, (2) mechanical (automotive) and diesel, (3) construction industry, (4) manufacturing industry, (5) business and office, (6) printing, publishing and allied, and (7) service occupations, by job titles; and how (1) public vocational and technical schools and (2) in-plant training programs are responding to the manpower needs.

The objectives of the study are listed as follows:

1. To find out the current number of trained workers needed in each occupational group by job title.
2. To analyze the anticipated employment growth in the two categories of manpower--skilled and technicians.
3. To ascertain from employers, the number of trained workers he/she expected to have on the payroll by 1980 and 1982 from graduates of their training programs.
4. To find out the percent of replacement needs for persons leaving the labor force due to retirement, death, promotion or other reasons per year in each

occupational area by job title.

5. To estimate the need for trained manpower in the various occupational groups by 1978, 1980 and 1982.
6. To obtain from the employers their estimate of the availability of trained persons in the different occupational groups, by job titles. The following indicators of availability were used: short, adequate, and surplus (oversupply).
7. To determine the extent to which public vocational-technical schools meet the labor demand of business and industrial establishments in the state.
8. To predict, using the "General Linear Model", the number of skilled and technician workers that would be needed in the Bendel State by occupational titles by 1985.

To cover thoroughly these objectives, they were used as a guide in designing the study. The data, gathered through a questionnaire, were based totally on information that would satisfy the stated objectives. Findings were grouped, with the objectives in mind, and then presented in a logical sequence for purposes of organization and better understanding, into five sections.

In the first section is a presentation of preliminary information. This section describes the target population according to size, occupational name and number of employers. The number of establishments surveyed in each occupational

group and percentage responses are briefly discussed in the first section titled "General Information Concerning the Population of the Study".

Section two presents the findings relating to the sources and current supply of skilled manpower in Bendel State by job titles for each of the seven occupational areas surveyed. Employers' rating of the availability of skilled labor, based on the combined output of all the existing preparatory programs, both planned formal public vocational and technical schools' programs and in-plant, apprenticeship or on-the-job training programs were summarized and are presented in this section. The data on the supply or availability of trained manpower, provided by employers, satisfied the demand of the sixth objective.

To satisfy objective 8, section three presents the findings relative to the past, present, and future employment of skilled and technician workers in Bendel State in only the available job titles within the state. Using the GLM statistical projective technique or methodology, definite manpower figures were predicted for the year 1985, for each available job title in the seven occupational areas surveyed. These projections could be drastically affected by a state or national emphasis on any of these occupational categories or other economic factor. Moreover, the section presents for each job title the required statistics obtained from the computer printout necessary for calculating projected manpower

figures for any particular year.

The number of workers needed to be trained by 1978, 1980, 1982 and 1985, and the proposed occupational preparatory or instruction programs are revealed by the data presented in section four. Also contained in this section is the information concerning current vacancies, expatriates employment, and the mean annual labor turnover rate which established the replacement needs for the various occupational titles. Employment growth due to expansion was abstracted from the data concerning employers' anticipated employment by 1980 and 1982. Employers' efforts at training their own workers, and the number of workers completing in-plant, apprenticeship or on-the-job training within the five-year period, which was necessary in order to establish the net training needs, are also included in this section. This section therefore fulfills the requirements of objectives 1, 2, 3, 4, and 5.

Findings on the supply of manpower by the public vocational and technical schools, and the results of the chi square test of significance difference between the supply and demand of skilled and technical workers are presented in the final section of chapter four. Specifically, this section, which satisfies the seventh objective, sought to determine the extent to which the public vocational and technical schools' programs have been responsive to the manpower needs of the state. The result of the chi square test

yielded information on the basis of which the following results were obtained.

1. Matching of job openings with training programs.
2. Program(s) where there is an overproduction of trained personnel.
3. Occupational instructional programs where there is no need for additional trained workers and expansion of the existing occupational preparatory programs.
4. Occupational areas in which expansion of the existing training programs is necessary.
5. A list of job openings in occupational areas where training programs were not currently being offered.

General Information Concerning the Population of the Study

The data presented in Table 1 concerned the size of the establishments which employed 10 or more regular workers in Bendel State. The table was adopted from the report of the 1975 manpower survey conducted by the State Ministry of Economic Development. Depicting the sizes of the establishments were code numbers which were chosen by the Ministry. The first four groups had uniform increments of 10 workers between groups; therefore, the number of workers with which one group exceeded the other rose to 25 for code numbers 06 and 07, and to 100 from code number 08 to 17.

Table 2 presents a summary of all the establishments

Table 1. Establishments in Bendel State grouped and coded according to number on payroll[a]

No. on establishment's payroll	Code no.
10-19	02
20-29	03
30-39	04
40-49	05
50-74	06
75-99	07
100-199	08
200-299	09
300-399	10
400-499	11
500-599	12
600-699	13
700-799	14
800-899	15
900-999	16
1000 and over	17

[a]This table was adopted from Table 11, page XLIV of the Ministry of Economic Development (Statistics Division) Manpower Survey of 1975.

that satisfied the criteria specified for inclusion in this study. These establishments, distributed all over the State of Bendel, were visited by the author. Printing, publishing and allied occupations had the least number of establishments with a total of 8, followed by agricultural, manufacturing and industrial, business, office and government occupations. Construction occupations had the greatest number of establishments with a total of 66 located mainly in the large urban centers within the state. The table also reveals that most of the establishments were of a small-scale

Table 2. The study population: number of establishments that satisfied the criteria for inclusion in the survey in each occupational group

Engagement size code no.	Occupational groups[a]							
	A	B	C	D	E	F	G	Total
02	1	8	2	32	2	12	-	57
03	1	12	4	6	-	10	5	38
04	1	9	5	2	-	1	8	26
05	1	6	1	8	1	2	2	21
06	3	12	7	5	1	2	4	34
07	1	6	-	2	-	2	1	12
08	-	5	5	3	-	4	3	20
09	-	-	4	1	-	-	1	6
10	-	3	-	1	-	1	-	5
11	1	1	1	-	-	1	2	6
12	-	-	-	-	2	1	1	4
13	-	-	-	-	1	-	-	1
14	-	1	1	2	-	1	3	8
15	-	-	1	1	-	-	-	2
16	-	-	1	-	1	-	-	2
17	1	3	1	-	-	1	5	11
Total	10	66	33	63	8	38	35	253

[a]Occupational groups: A = agricultural related; B = construction; C = manufacturing and industrial; D = mechanical (automotive) and diesel; E = printing, publishing and allied; F = service; G = business, office and government.

nature with an average number of 15 and 25 workers. Out of the 11 establishments, with a population of 1,000 and more, five or 45.45% were government ministries with branches in all the administrative divisional headquarters and urban centers.

All the 253 establishments were contacted. However, only 143 or 56.52% participated in the study. The greatest response received was from employers in agricultural and construction occupations where the percentage responses were 70 and 68.16%, respectively. Moreover, Table 3 reveals that out of the 11 government ministries to which the State Military Governor sent letters soliciting their cooperation in responding to the survey, only 6 accepted to participate. Of the 24 private offices, only 9 responded providing this group of employers with a 37.5% response.

The Labor Position and Sources of Labor Supply in Bendel State

An important aspect of the study was to determine the labor situation as revealed in the current supply of trained workers in Bendel State. Hence, employers were asked to rate and indicate whether the supply of trained workers in the state is short, adequate, or surplus. Prior to checking the supply of trained workers as short, adequate, or surplus, employers had been asked to indicate the number of people currently receiving in-plant training in their establishments

Table 3. Actual study population: number and percent responses by occupational group

Occupational group	Number of employees Contacted	Responded	% response
Agricultural related	10	7	70.00
Construction	66	45	68.182
Manufacturing and industrial	33	22	66.667
Mechanical (automobile) and diesel	63	36	57.143
Printing, publishing and allied	8	5	62.50
Office and business			
Private offices	24	9	37.50
Government ministries	11	6	54.545
Service	38	13	34.210
Total	253	143	56.522

to fill vacancies, created due to expansion and replacement of workers vacating their positions as a result of promotion, retirement, resignation, or death.

Table 4 contains a summary of the findings relating to the sources and current supply of skilled (including technical) manpower in Bendel State in each job title for agricultural and related occupations.

Three hundred and eighty-one skilled and technician

workers were employed in agricultural and related occupations in Bendel State in 1978. Out of this number, 258 or 67.72% were trained in public vocational agricultural schools, compared to the 66 or 17.32% and 21 or 5.51% that were graduates of in-house and apprenticeship training programs, respectively.

A good proportion, 36 or 9.45%, of all the skilled and technician workers engaged in agricultural occupation were foreign nationals. Although some expatriates were employed in field work, the job area in which expatriates were engaged was laboratory testing. Specifically, 15 of the 36 expatriates in agricultural occupations were working as laboratory testers, 7 or 19.44% as farm equipment mechanics, and the next highest number--4 or 11.11%--as sprayers. The data presented in Table 4 further reveals a total of 11 job areas that were nonexistent in agriculturally related occupations in Bendel State. Moreover, important positions such as farm supervisor/technician, greens superintendent were filled by graduates of formal vocational agricultural schools. All the 5 farm supervisors and 16 or 76.19% of the 21 greens superintendents were trained in formal vocational schools of agriculture.

Trained intermediate agricultural personnel were in short supply in Bendel State of Nigeria. Nineteen job titles existed in the area surveyed. Out of the 19 job titles available in agricultural occupations, 15 or 78.95% were

Table 4. Sources and current supply of skilled manpower in Bendel State by job titles for agricultural and related occupations

Job title	Employment by 1978	No. and % trained in:[a] PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
1. Meat dresser	18	18	100	-	-	-	-
2. Final dressing inspector	-	-	-	-	-	-	-
3. Meat grader	-	-	-	-	-	-	-
4. Grader, ag. commodities	-	-	-	-	-	-	-
5. Dairy proc. eq. opr.	-	-	-	-	-	-	-
6. Lab tester	44	29	65.91	-	-	-	-
7. Lab supr.	10	6	60	-	-	4	40
8. Farm eq. mech.	77	60	77.92	7	9.09	3	3.9
9. Farm eq. mech. helper	30	22	73.33	4	13.33	4	13.33
10. Farm mach. set-up man	8	3	87.5	-	-	3	37.5
11. Ag. mach. parts man	-	-	-	-	-	-	-
12. Ag. mach. welder	22	12	54.55	4	18.18	2	9.09
13. Ag. feed mix spec.	2	1	50	-	-	1	50
14. Feed res. aide	-	-	-	-	-	-	-
15. Salesman grain & feed	5	2	40	-	-	3	60
16. Artificial brdg. tech.	-	-	-	-	-	-	-
17. Storage tech.	2	2	100	-	--	-	-
18. Poultry tech.	19	4	21.05	-	-	15	78.95
19. Truck drv., hvy	69	54	78.26	3	4.35	12	17.39
20. Gloral designer	-	-	-	-	-	-	-
21. Nursery wkr.	12	7	58.33	-	--	3	-
22. Sprayer	30	15	50	2	6.67	9	30
23. Serviceman, liq. fertilizer	-	-	-	-	-	-	-
24. Salesman, gen. hardware	-	-	-	-	-	-	-

[a] PV-TS = public vocational-technical schools; APT = apprenticeship training programs; In-PlTP = in-plant training programs; O.C. = other countries in this and the following tables.

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No. response		Total	
N	%	N	%	N	%	N	%	N	%	N	%
-	-	-	100	-	-	-	-	-	-	3	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	--
-	-	-	-	-	-	-	-	-	-	-	-
15	34.09	2	50	1	25	-	-	1	25	4	100
-	-	1	50	-	-	-	-	1	50	2	100
7	9.09	3	42.86	2	28.57	-	-	2	28.57	7	100
-	-	2	50	2	50	-	-	-	-	4	100
2	25	-	25	-	-	2	100	-	-	2	100
-	-	-	-	-	-	-	-	-	-	-	-
4	18.18	2	50	2	50	-	-	-	-	4	100
-	-	1	100	-	-	-	-	-	-	1	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	2	100	-	-	-	-	-	-	2	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	1	100	-	-	-	-	-	-	1	100
-	-	3	75	-	-	-	-	1	25	4	100
-	-	4	57.14	2	28.57	-	-	1	14.29	7	100
-	-	-	-	-	-	-	-	-	-	-	-
2	16.67	3	50	2	33.33	-	-	1	16.67	6	100
4	13.33	3	50	2	33.33	-	-	1	16.67	6	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Table 4. (Continued)

Job title	Employment by 1978	No. and % trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
25. Greens supt.	21	16	76.19	-	-	3	14.29
26. Tree surgeon	3	-	-	-	-	3	100
27. Tree pruner	2	1	50	-	-	1	50
28. Biol. aide	-	-	-	-	-	-	-
29. Farm Supr./tech.	5	5	100	-	-	-	-
30. Bookkeeper	2	1	50	1	50	-	-
Total	381	258	67.72	21	5.51	66	17.32

Table 5. Sources and current supply of skilled manpower in Bendel State by job titles for mechanical (automotive) and diesel occupations

Job title	Employment by 1978	No. and % trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
1. Auto mech.	243	47	19.34	151	62.14	45	18.52
2. Auto tune-up mech.	27	2	7.41	18	66.67	7	25.93
3. Front end align. man	26	6	23.08	13	50	7	26.92
4. Trans. mech.	35	11	31.43	11	31.43	13	37.14
5. Brakeman, auto.	114	38	33.33	74	64.91	2	1.75
6. Auto air cond. mech.	14	-	-	9	64.29	5	35.71
7. Auto parts man	94	20	21.28	29	30.85	45	47.87
8. Tractor mech.	20	-	-	18	90	2	10
9. Const. eq. mech.	112	18	16.07	46	41.07	32	28.57
10. Auto body rep.	97	18	18.56	59	60.82	20	20.62
11. Auto spray painter	45	16	35.56	20	44.44	9	20
12. Auto maintenance mech.	55	16	29.09	25	45.45	14	25.45
13. Auto serv. sta. attendant	26	5	19.23	14	53.85	7	26.92
14. Fuel injection serviceman	13	2	15.38	9	69.23	2	15.38
15. Tire repairman	27	2	7.41	18	66.67	7	25.93

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
2	9.52	2	66.67	1	33.33	-	-	-	-	3	100
-	-	2	100	-	-	-	-	-	-	2	100
-	-	1	100	-	-	-	-	-	-	1	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	2	100	-	-	-	-	-	-	2	100
-	-	1	100	-	-	-	-	-	-	1	100
36	9.45	38	61.29	16	25.81	-	-	8	12.9	62	100

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
-	-	4	11.11	19	52.78	11	30.56	2	5.56	36	100
-	-	4	20	12	60	4	20	-	-		100
-	-	-	-	12	63.16	4	21.65	3	15.79	19	100
-	-	-	-	12	75	4	25	-	-	16	100
-	-	4	21.05	12	63.16	-	-	3	15.79	19	100
-	-	7	70	1	10	-	-	3	20	10	100
-	-	9	32.14	14	50	-	-	5	17.86	28	100
-	-	8	50	8	50	-	-	-	-	16	100
16	14.29	27	69.33	9	23.08	-	-	3	7.69	39	100
-	-	;3	44.83	15	51.72	-	-	1	3.45	29	100
-	-	12	75	4	25	-	-	-	-	16	100
-	-	8	47.06	3	17.65	4	23.53	2	11.76	17	100
-	-	7	58.33	5	41.67	-	-	-	-	12	100
-	-	7	70	3	30	-	-	-	-	10	100
-	-	15	100	-	-	-	-	-	-	15	100

Table 5. (Continued)

Job title	Employment by 1978	No. and % trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
16. Gas eng. rpmn. (2- & 4-cycle)	13	-	-	11	84.62	2	15.38
17. Diesel mech.	272	79	29.04	146	53.68	32	11.76
18. Trans. mech. (diesel)	16	-	-	14	87.5	2	12.5
19. Pipe fitter, diesel eng.	13	4	30.77	5	38.46	4	30.77
20. Tractor-trlr. truck drvr.	308	9	2.92	283	91.88	16	5.2
21. Light truck drvr. driver	254	34	13.39	189	74.41	31	12.2
22. Bus driver[a]	126	-	-	120	95.24	6	4.76
Total	1950	327	16.77	1282	65.74	310	15.77

[a]Job title supplied by employers.

Table 6. Sources and current supply of skilled manpower in Bendel State by job titles for construction occupation

Job title	Employment by 1978	No. and % trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
1. Hvy eq. or earth moving mach. opr. (bulldozer etc.)	174	106	60.92	42	24.14	26	14.94
2. Carpenter fmn.	148	52	35.14	64	43.74	32	21.62
3. Carpenter	1462	1092	74.69	284	19.43	86	5.88
4. Floor layer	217	123	56.68	49	22.58	45	20.74
5. Roofer	395	164	41.52	136	34.43	78	19.75
6. House rprm.	42	4	9.52	22	52.38	16	38.1
7. Maintenance man	49	27	55.1	22	44.9	-	-
8. Plumbing (plum. & pipe fitter)	174	86	49.43	34	19.54	38	21.84
9. Bricklayer, mason mason	432	246	56.94	97	22.45	89	20.6
10. Concrete work-foreman	130	40	30.77	56	43.08	28	21.54

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
-	-	6	54.55	4	36.36	-	-	1	9.09	11	100
15	5.51	12	54.55	7	31.82	-	-	3	13.64	22	100
-	-	9	100	-	-	-	-	-	-	9	100
-	-	7	77.78	-	-	-	-	2	22.22	9	100
-	-	18	85.71	-	-	-	-	3	14.29	21	100
-	-	4	14.29	23	82.14	-	-	1	3.57	28	100
-	-	-	-	1	100	-	-	-	-	1	100
31	1.59	181	44.91	164	40.69	27	6.7	31	7.69	403	100

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
-	-	14	70	5	25	-	-	1	5	20	100
-	-	5	55.56	3	33.33	1	11.11	-	-	9	100
-	-	18	47.37	15	39.47	5	13.16	-	-	38	100
-	-	16	66.67	7	29.17	-	-	1	4.17	24	100
17	4.3	15	50	7	30	-	-	6	20	30	100
-	-	-	-	3	100	-	-	-	-	3	100
-	-	2	20	5	50	-	-	3	30	10	100
16	9.2	23	67.65	8	23.53	-	-	3	8.82	34	100
-	-	23	65.71	-	-	-	-	3	8.57	35	100
6	4.62	21	51.22	18	43.9	-	-	2	4.88	41	100

Table 6. (Continued)

Job title	Employment by 1978	No. and trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
11. Concreting mach. opr./driver	306	40	13.07	162	52.94	82	26.8
12. Plasterer (tend. with motor)	390	314	80.51	54	13.85	22	5.64
13. Draftsman, arch.	96	35	36.46	42	43.75	9	9.38
14. Draftsman, elec.	98	46	46.94	16	16.33	28	28.57
15. Estimator	56	24	42.86	10	17.86	10	17.86
16. Constr. wkr.	1047	70	6.69	801	76.5	172	16.43
17. Strct. steel worker	412	72	17.48	176	42.72	64	15.53
Total	5628	2541	45.15	2067	36.73	825	14.66

Table 7. Sources and current supply of skilled manpower in Bendel State by job titles for manufacturing and industrial occupation

Job title	Employment by 1978	No. and trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
1. Machinist	184	85	46.2	34	18.48	58	31.52
2. Tool & die maker	-	-	-	-	-	-	-
3. Insp., floor	68	22	32.35	3	4.41	24	35.29
4. Insp., garage	56	39	69.64	13	23.21	3	5.36
5. Insp., general	82	43	52.44	1	1.22	16	19.51
6. Set-up man (job setter)	377	175	46.42	123	32.63	57	15.12
7. Die setter	-	-	-	-	-	-	-
8. Heat treater	-	-	-	-	-	-	-
9. Eng. lathe set-up operator	104	37	35.58	9	8.65	42	40.38
10. Turrent lathe set-up opr.	116	54	46.55	15	12.93	36	31.03
11. Milling mach. set-up opr.	83	27	31.03	19	21.84	37	42.53
12. Grinding mach. operator	62	13	20.97	18	29.03	31	50

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
22	7.19	5	12.2	32	78.05	-	-	4	9.76	41	100
-	-	10	40	14	56	-	-	1	4	25	100
10	10.42	6	54.55	5	45.45	-	-	-	-	11	100
8	8.16	12	70.59	3	17.65	-	-	2	11.76	17	100
12	21.43	21	63.64	9	27.27	-	-	3	9.09	33	100
4	0.38	4	14.29	19	67.86	-	-	5	17.86	28	100
100	24.27	17	56.67	12	40	-	-	1	3.33	30	100
195	3.46	212	49.42	176	41.03	6	1.4	35	8.16	429	100

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
7	3.8	5	29.41	10	58.82	-	-	2	11.76	17	100
-	-	-	-	-	-	-	-	-	-	-	--
19	27.94	-	-	5	62.5	-	-	3	37.5	8	100
1	1.79	7	58.33	3	25	-	-	2	16.67	12	100
22	26.83	7	33.33	14	66.67	-	-	-	-	21	100
22	5.84	15	78.95	3	15.79	-	-	1	5.26	19	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
16	15.38	4	40	5	50	-	-	1	10	10	100
11	9.48	5	55.56	4	44.44	-	-	-	-	9	100
-	-	4	33.33	7	58.33	-	-	1	8.33	12	100
-	-	3	27.27	5	45.45	-	-	3	27.27	11	100

Table 7. (Continued)

Job title	Employment by 1978	No. and trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
13. Screw mach. set-up opr.	-	-	-	-	-	-	-
14. Drill press opr.	52	27	51.92	9	17.31	11	21.15
15. Fourcault mach. prod. crew[a]	49	28	57.14	11	22.45	10	20.41
16. Mach. moulder	-	-	-	-	-	-	-
17. Furnace opr.	9	8	88.89	-	-	1	11.11
18. Core maker	-	-	-	-	-	-	-
19. Maint. mech.	321	117	36.45	88	27.41	89	27.73
20. Stationary eng.	23	6	26.07	-	-	13	56.52
21. Layout man	42	27	64.29	-	-	6	14.29
22. Pattern maker, metal	131	54	41.22	28	21.37	36	27.48
23. Sheet metal wkr.	175	63	36	54	30.86	58	33.14
24. Pattern maker, metal, bench	13	9	69.23	4	30.77	-	-
25. Welder, gas	59	19	32.2	15	25.42	20	33.9
26. Welder, arc	223	49	21.97	63	28.25	108	48.43
27. Welder, comb.	108	36	33.33	3	2.78	54	50
28. Welder, heliarc	7	3	42.86	4	57.14	-	-
29. Welding mach. opr.	12	7	58.55	1	8.33	4	33.33
30. Mettalurgist asst. (tech.)	-	-	-	-	-	-	-
31. Mech. eng. tech.	188	128	68.09	11		36	19.15
32. Instr. tech.	177	55	31.07	33	18.64	58	17.51
33. Draftsman, mech.	39	23	58.97	3	7.69	10	25.64
34. Painter, spray	106	45	42.45	13	12.26	42	39.62
35. Finisher[a]	62	36	58.06	7	11.29	17	30.65
36. Chem. lab. tech.	9	3	33.33	-	-	5	55.56
Total	2937	1238	42.15	582	13.82	884	30.1

[a]Job title supplied by employers.

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
-	-	-	-	-	-	-	-	-	-	-	-
5	9.62	1	14.29	5	71.43	-	-	1	14.29	7	100
-	-	1	100	-	-	-	-	-	-	1	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	1	100	-	-	-	-	-	-	1	100
-	-	-	-	-	-	-	-	-	-	-	-
27	8.41	11	52.38	5	23.81	-	-	-	-	21	100
4	17.37	4	80	1	20	-	-	-	-	5	100
9	21.43	5	55.56	-	-	1	11.11	3	33.33	9	100
13	9.92	7	70	3	30	-	-	-	-	10	100
-	-	4	66.67	1	16.67	-	--	1	16.67	6	100
-	-	3	75	1	25	-	-	-	-	4	100
5	8.47	6	54.55	4	36.36	-	-	1	9.09	11	100
3	1.35	7	43.75	5	31.25	2	12.5	2	12.5	16	100
15	13.39	6	75	2	25	-	-	-	-	8	100
-	-	1	100	-	-	-	-	-	-	1	100
-	-	-	-	1	100	-	-	-	-	1	100
-	-	-	-	-	-	-	-	-	-	-	-
13	6.71	8	50	6	37.5	-	-	2	12.5	16	100
31	17.51	6	66.67	2	22.22	-	-	1	11.11	9	100
3	7.69	3	50	2	33.33	-	-	1	16.67	6	100
6	5.66	9	69.23	4	30.77	-	-	-	-	13	100
-	-	-	-	1	100	-	-	-	-	1	100
1	11.11	1	100	-	-	-	-	-	-	1	100
233	7.93	134	50.38	99	37.22	3	1.12	30	11.28	266	100

indicated to be in need of trained workers. Only farm machinery set-up men, which provided a 100% response, farm equipment mechanic helper and agricultural machinery welder which were checked by four employers each were the job titles checked as having adequate number of trained workers.

In contrast with agricultural occupations, the supply of trained workers in mechanical (automotive) and diesel occupations is fairly adequate (Table 5). Twenty-two job titles were listed under the mechanical (automotive) and diesel occupational cluster. Out of the 22 job titles, 10 or 45.45% were checked by employers indicating an adequate supply of trained workers in these areas. Job titles in which there is an adequate supply of trained workers included automotive mechanic, automobile tune-up mechanic, front end alignment man, transmission mechanic, and others. These job titles were checked by 50% or more of the employers who employed workers in these job areas. Other employers in these same areas indicated that these areas already had an oversupply of trained workers. For example, 11 or 30.56% of the 36 employers who employed automobile mechanics checked the current supply of automobile mechanics as being surplus, while 5.56% were undecided. Similarly, automobile tune-up mechanic, front end alignment man, and transmission mechanic were checked by 20, 21.05, and 25%, respectively, as areas where there was already an overproduction of trained workers. The data also indicated that this occupational cluster had the

greatest proportion of "no response" respondents. Out of the 403 responses that were recorded for this occupational area, 31 or 7.69% were undecided as to the current position of trained workers in the Bendel State. One hundred and eighty-one or 44.9% of the 403 respondents checked the supply of trained workers as being short, 164 or 40.69% checked the supply as adequate while 27 or 6.7% checked the supply as being surplus. Occupational titles which could be regarded as areas having short supply of trained workers included automobile air conditioning mechanic, construction equipment mechanic, automobile spray painter, fuel injection service man, etc. with responses ranging from a low of 54.55% to a high of 100%.

The greatest number of skilled and technician workers in automobile and diesel occupations were employed from graduates apprenticeship training programs which provided 1,282 or 65.74% of the total 1,950 workers employed in this occupational area in 1978. Public vocational and technical schools supplied the next highest number, 327 or 16.77%, of all the workers employed in automobile and diesel occupations in programs which trained 210 or 15.9% of the workers. Very few expatriates, 31 or 1.59%, were found in this occupational area.

The total number of persons employed in 1978, in all the job titles listed under construction occupation was 5,628 (Table 6). Of this number, 2,541 or 45.15% were employed

from graduates of the public vocational-technical schools, 2,067 or 36.73% were employed from graduates of apprenticeship training programs, 825 or 14.66% of the total employment were graduates of in-plant training programs and 195 or 3.46% were expatriates. Out of the 5,628 persons employed in construction occupations, 1,462 or 25.98% were carpenters and 148 were carpenter foremen. Carpentry therefore accounted for 28.61% of the total employment in construction occupations. This was followed in rank order by construction workers which represented 18.6% of the total employment. The category of structural steel worker, where a total of 412 persons were employed, was fourth in rank order. Bricklayer-mason, which exceeded the number of structural steel workers, had a total of 432 persons in 1978. Public vocational-technical schools provided the greatest number of employees in almost all the occupational titles. Only in carpenter foreman, house repairman, concrete work foreman, concreting machines operator/driver, construction worker and structural steel worker was the number of workers drawn from the graduates of public vocational-technical schools exceeded by the number trained in apprenticeship programs. Eleven out of the 17 job titles listed under construction occupations were checked by employers who employed labor in those occupational areas as having short supply of trained workers. Carpenter which was checked by 18 or 47.37%, 15 or 39.47%, and 5 or 13.16% of the 38 respondents as having short, adequate, and

surplus supply of trained workers, respectively, was not included in the 11 job areas which had short supply of trained workers. Only four job titles had adequate supply of trained workers. These included house repairman, concreting machines operator/driver, plasterer (rendering), and construction worker.

Out of the 36 job titles listed under manufacturing and industrial occupations (Table 7), three were supplied by employers and seven were found to be nonexistent. Nineteen or 70.37% of the remaining 27 job titles were checked by employers, who employ skilled and technician workers in these areas, as areas where trained workers are in short supply. Out of the 27 job titles, 8 or 29.63% were reported as areas where there was an adequate supply of trained skilled and technician workers, although none of the 27 job titles were checked as having surplus supply of trained workers. Few employers, 20 or 11.28% of the total 266 respondents, did not choose any of the three indicators of availability of trained manpower.

The manufacturing cluster is another area where most of the skilled and technician workers were graduates of public vocational and technical schools. Out of the 2,937 workers employed in all the 27 job areas, 1,238 or 42.15% were trained in public vocational and technical schools. Graduates of in-plant training programs which ranked second made up 30.1% (i.e., 884) of the total skilled labor force in the

manufacturing and industrial occupations. Followed in rank order was the group of workers trained through apprenticeship courses. The number of expatriates employed in manufacturing and industrial occupations was 233 or 7.93% of the total skilled labor force in 1978.

In business and office including government occupations, several job titles were analyzed as stated in chapter three. General clerk which comprised five occupational titles had the greatest number of workers in 1978, followed by bookkeeping and accounts, and secretarial science where only 44 persons were employed as either secretary or stenographer (Table 8). A unique feature of the office occupational cluster was the fact that all the workers were graduates of public vocational schools, with the exception of three job areas--library assistant, purchasing agent, and photographer. Most of the employees in these job groups were trained in apprenticeship programs. Out of the 1,395 employees in the business and office cluster, 1,340 or 96.06% were graduates of regular vocational schools.

Another unique characteristics of the business and office, including government occupational group, was the fact that all the available job titles were indicated to be areas where there is a lack of trained workers. Of the 15 employers of general clerks, 9 or 60% indicated that this category of workers is in short supply while 6 or 40% checked that trained general clerks were adequate and readily

Table 8. Sources and current supply of skilled manpower in Bendel State by job titles for business and office, including government occupations

Job title	Employment by 1978	No. and trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
1. Secretary Stenographer	44	44	100	-	-	-	-
2. Trans. mach. opr. (dictaphone)	-	-	-	-	-	-	-
3. Clerk & clerk typist							
4. Receptionist							
5. Tel. opr.							
6. Gen. Clerk	1183	1183	100	-	-	-	-
7. Dupl. mach. opr.							
8. Collator opr.	-	-	-	-	-	-	-
9. Shipping & rec. clerk							
10. Stock clerk							
11. Acct. clerk							
12. Billing mach. opr.	102	102	100	-	-	-	-
13. Bookkeeper							
14. Calc. mach. opr.							
15. Stat. clerks & compilers							
16. Bookeeping mach. opr.	-	-	-	-	-	-	-
17. Library asst.	27	8	29.63	19	70.37	-	-
18. Purchasing agent	14	3	21.43	11	78.57	-	-
19. Photographer	25	-	-	25	100	-	-
Total	1395	1340	96.06	55	3.94	-	-

O.C.		Current supply of trained workers									
		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
-	-	10	66.67	5	33.33	-	-	-	-	15	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	9	60	6	40	-	-	-	-	15	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	8	66.67	4	33.33	-	-	-	-	12	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	4	50	4	50	-	-	-	-	8	100
-	-	5	33.33	1	16.67	-	-	-	-	6	100
-	-	4	100	-	-	-	-	-	-	4	100
-	-	40	66.67	20	33.33	-	-	-	-	60	100

available.

Only 315 skilled and technician workers were employed in 1978 in the five printing, publishing and allied establishments which participated in the survey. Out of the 315, only 17 or 5.4% received their training in public vocational-technical schools. Most of the workers were trained in apprenticeship and in-plant training programs. Specifically, 185 or 58.73% and 113 or 35.87% of the 315 workers were trained in apprenticeship and in-plant training programs, respectively. Compositor (typographer) was the only job title in which 100 or more persons were employed .

Apart from "bookbinder" where two or 40% of the responding employers checked the current supply of trained workers as adequate, the "platen and letter pressman" was indicated to be another area in which there was adequate supply of trained workers by 2 or 40% of the 5 employers. The remaining 11 job areas provided limited information (see Table 9 for other details).

Table 10 presents a summary of the sources and current supply of skilled workers in service occupations. Out of the 13 job titles listed in this occupational cluster, one job title was supplied by an employer, and 4 were brought in from other related occupations. These included electronics technician, electrician, lineman, and electromechanical technician. Electronics technician and electrician, which were brought in from other occupational groups, accounted for

Table 9. Sources and current supply of skilled manpower in Bendel State by job titles for printing, publishing and allied occupations

Job title	Employment by 1978	No. and % trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
1. Foreman, prt. shop	37	8	21.62	17	45.95	12	32.43
2. Off-set pressman	18	7	38.89	-	-	11	61.11
3. Multilith opr.	9	2	22.22	3	33.33	4	44.44
4. Silk screen prtr.	-	-	-	-	-	-	-
5. Job printer	31	-	-	20	64.52	11	35.48
6. Photo engraver	-	-	-	-	-	-	-
7. Photogr. (litho)	9	-	-	4	44.44	5	55.56
8. Photogr. (nelos)	--	-	-	-	-	-	-
9. Folding mach. opr.	8	-	-	5	62.5	3	27.5
10. Comm. artist (illustrator)	5	-	-	-	-	5	100
11. Platen & letter pressman	13	-	-	10	76.92	3	23.08
12. Linotype opr.	7	-	-	3	42.86	4	57.14
13. Compositor (typographer)	109	-	-	80	73.39	29	26.61
14. Linotype mach.	8	-	-	6	75	2	25
15. Bookbinder	52	-	-	32	61.54	20	38.46
16. Cutter opr.	9	-	-	5	55.56	4	44.44
Total	315	17	5.4	185	58.73	113	35.87

O.C.		Current supply of trained workers									
		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
-	-	4	80	1	20	-	-	-	-	5	100
-	-	4	80	-	-	-	-	1		5	100
-	-	4	80	-	-	-	-	1	20	5	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	2	40	1	20	-	-	2	40	5	100
-	-	-	-	-	-	-	-	-	-	-	100
-	-	4	80	1	20	-	-	-	-	5	100
-	-	-	-	-	-	-	-	-	-	-	-
-	-	5	100	-	-	-	-	-	-	5	100
-	-	2	66.67	-	-	-	-	1	33.33	3	100
-	-	2	40	2	40	-	-	1	20	5	100
-	-	4	80	1	20	-	-	-	-	5	100
-	-	4	80	1	20	-	-	-	-	5	100
-	-	5	100	-	-	-	-	-	-	5	100
-	-	-	-	2	70	1	20	2	40	5	100
-	-	5	100	-	-	-	-	-	-	5	100
-	-	45	71.43	9	14.29	1	1.59	8	12.7	63	100

Table 10. Sources and current supply of skilled manpower in Bendel State by job titles for service occupation

Job title	Employment by 1978	No. and % trained in: PV-TS N	PV-TS %	ATP N	ATP %	In-PlTP N	In-PlTP %
1. Refrigeration mech.	11	7	63.64	2	18.18	2	18.18
2. Air conditioning mech. (comm.)	10	3	30	4	40	3	30
3. Air conditioning mech. (domestic)	10	2	20	5	50	3	30
4. TV and radio serv. & repmn.	40	18	45	13	32.5	5	12.5
5. Elect. mech.	29	15	51.72	11	37.93	3	10.34
6. Elect. tech.	62	31	50	-	-	12	19.35
7. Instrument repairman	9	--	-	-	-	9	100
8. Electric motor repairman	57	2	3.51	27	47.37	23	40.35
9. Elect. appl. repairman	17	11	64.71	4	23.53	2	11.76
10. Electrician	1522	721	47.37	465	30.55	21	1.38
11. Lineman	55	32	58.18	13	23.64	4	7.27
12. Turbine & boiler operator	30	3	10	5	16.67	20	66.67
13. Electro-mech. tech.	8	2	25	3	37.5	2	25
Total	1860	847	45.54	552	27.68	403	21.67

		Current supply of trained workers									
O.C.		Short		Adequate		Surplus		No response			
N	%	N	%	N	%	N	%	N	%	Total	
-	-	4	66.67	2	33.33	-	-	-	-	6	100
-	-	3	60	2	40	-	-	-	-	5	100
-	-	3	50	2	33.33	-	-	1	16.67	6	100
4	10	4	57.14	3	42.86	-	-	-	-	7	100
-	-	6	100	-	-	-	-	-	-	6	100
19	30.65	3	75	-	-	-	-	1	25	4	100
-	-	3	100	-	-	-	-	-	-	3	100
5	8.77	5	71.43	1	14.29	-	-	1	14.29	7	100
-	-	3	42.86	3	42.86	-	-	1	14.29	7	100
21	1.38	38	60.32	21	33.33	-	-	4	6.35	63	100
6	10.91	7	43.75	9	56.25	-	-	-	-	16	100
2	6.67	1	100	-	-	-	-	-	-	1	100
1	12.5	-	-	1	100	-	-	-	-	1	100
58	3.12	80	60.61	44	33.33	-	-	8	6.06	132	100

158 or 85.16% of the total employment in the service cluster in 1978. Of the 1,860 workers, 58 or 3.12% were foreign nationals. Eight hundred and forty-seven or 45.54% of the total employment figure had their pre-employment training in public vocational schools, 552 or 29.68% had their pre-service training in apprenticeship training programs, and the remaining 403 or 21.67% were trained on the job. There was a prevailing shortage of trained workers in the service occupational cluster (see Table 10 for details).

Past, Present and Future Employment of Skilled and Technician Workers in Bendel State

One of the assumptions of this study was that employers of skilled and technician workers will be able to estimate the number of workers they would have in each job title by 1980 and 1982, on the basis of what the past trend had been. Although not stated, it was anticipated that it would be very difficult for employers to make fairly accurate estimates concerning the number of workers they would employ in more than five years time from now.

Therefore, to obtain accurate manpower figures for any future time, on the basis of the past employment trend, the GLM statistical method was utilized. This statistical technique made possible predicting the number of workers that would be in employment in each of the available job titles in 1985.

From the computer output, the data presented in Table 11 were obtained. The main purpose of compiling this table from the computer output was to make possible any prediction concerning the number of workers required in any of the job titles at any particular period of time desired by any interested group, body, or individual.

Thus, Table 11 contains those factors of the GLM--slope and intercept--necessary for extracting and obtaining the result of the regression equation for each job title.

Figure 1 is a graphical representation of the manpower trend from 1974 to 1982 and the predicted value for 1985. Below the figure is an example of how the regression equation was solved to obtain the predicted manpower figure by 1985 for the job title--farm supervisor technician--in the agricultural and related occupational cluster.

Table 12 presents a summary relative to the projected number of workers that would be employed in agricultural and related occupations by 1985. The data presented in the table were obtained directly from employers' responses to the questionnaire items which sought information about the number of workers each employer had each year starting from 1974 in each of the job titles existing in his/her establishment. Starting from 1974, each employer entered the number of workers he/she employed, and thus revealed what the employment trend was from 1974 to 1982, based on the projected employment. Based on the trend, the computer predicted the number of workers

Table 11. Major factors (parameters) of the regression equation or prediction model (GLM) obtained from the computer output for the existing job titles

Job title	Slope	Intercept	R^2	Prob.
Agricultural & related occupations				
Meat dresser	4.8503	-9577.2635	0.9839	0.0001
Laboratory tester	1.5599	-3039.6946	0.8739	0.002
Laboratory supervisor	1.6018	-3157.5808	0.8816	0.0017
Farm equipment mechanic	5.6497	-11102.7365	0.9362	0.0004
Farm equipment mechanic helper	7.0154	-13848.1737	0.9688	0.0001
Farm machinery set-up man	1.0064	-1983.2695	0.8942	0.0013
Agric. machinery welder	3.2994	-6507.4731	0.9568	0.0001
Agric. feed mix specialist	0.6796	-1342.0838	0.9642	0.0001
Salesman grain and feed	1.0928	-2155.6766	0.8709	0.0021
Storage technician	0.3802	-750.6108	0.9287	0.0005
Poultry technician	5.6317	-11118.9281	0.974	0.0001
Truck driver, heavy	9.2186	-18164.3353	0.9628	0.0001
Nursery worker	1.2725	-2503.7605	0.8611	0.0026
Sprayer	3.1946	-6287.2575	0.9532	0.0002
Greens superintendent	3.7515	-7404.3174	0.905	0.001
Tree surgeon	1.3892	-2741.515	0.7823	0.0082
Tree pruner	0.4072	-803.3234	0.8932	0.0013
Farm supervisor technician	1.5	-2960.9999	0.9513	0.0002
Bookkeeper	0.4072	-803.3234	0.8932	0.0013
Mechanical (auto) & diesel occupations				
Automobile mechanic	33.7695	-66572.1257	0.9921	0.0001
Automobile tune-up mechanic	6.6886	-13196.988	0.9055	0.001
Front end alignment man	4.7635	-9394.8563	0.9193	0.0006

Table 11. (Continued)

Job title	Slope	Intercept	R^2	Prob.
Transmission mechanic	6.6257	-13065.6587	0.9451	0.0002
Brakeman, automobile	19.4491	-38352.2096	0.9703	0.0001
Automobile air conditioning mech.	3.9072	-7713.3234	0.9727	0.0001
Automobile parts man	11.9192	-23477.8623	0.9348	0.0004
Tractor mechanic	6.1856	-12209.3533	0.8969	0.0012
Construction equipment mechanic	14.5808	-28748.1377	0.9106	0.0008
Automobile body repairman	19.9132	-39283.5928	0.9702	0.0001
Automobile spray painter	8.1168	-16003.7545	0.8718	0.0021
Automobile maintenance mechanic	11.0509	-21798.7904	0.9741	0.0001
Automobile service station attendant	4.8443	-9552.994	0.8657	0.0024
Fuel injection serviceman	4.0329	-7960.982	0.9251	0.0005
Tire repairman	5.518	-10886.8084	0.9208	0.0006
Gasoline engine repairman (2- and 4-cycle)	4.6916	-9261.6228	0.9153	0.0007
Diesel mechanic	40.9072	-80645.3233	0.9454	0.0002
Transmission mechanic (diesel)	3.0868	-6089.4072	0.9847	0.0001
Pipefitter, diesel engine	2.485	-4902.8263	0.9729	0.0001
Tractor-trailer truck driver	36.1916	-71272.6228	0.8013	0.0065
Light truck driver	21.3054	-41885.7425	0.9945	0.0001
Bus driver	13.1587	-25907.6407	0.6843	0.0217
<u>Construction occupations</u>				
Heavy equipment or earth moving machines operator	24.491	-48265.0958	0.9147	0.0007
Carpenter foreman	28.6886	-56611.988	0.9787	0.0001
Carpenter	158.1617	-311499.2754	0.9826	0.0001
Floor layer	13.7246	-26925.6048	0.8908	0.0014

Table 11. (Continued)

Job title	Slope	Intercept	R^2	Prob.
Roofer	48.2335	-95010.509	0.8705	0.0021
House repairman	9.2096	-18172.4311	0.9476	0.0002
Maintenance man	8.6467	-17051.1018	0.9226	0.0006
Plumbing (plumber & pipefitter)	24.6677	-48632.5449	0.9875	0.0001
Bricklayer, mason	31.7725	-62388.7605	0.9773	0.0001
Concrete work foreman	28.3772	-56001.976	0.9629	0.0001
Concreting machines operator/driver	44.0958	-86910.3114	0.9927	0.0001
Plasterer (rendering)	24.4671	-48008.018	0.9625	0.0001
Draftsman, architectural	18.0359	-35580.6168	0.9403	0.0003
Draftsman, electrical	16.994	-33523.7305	0.9385	0.0003
Estimator	10.1677	-20059.5449	0.917	0.0007
Construction worker	263.4222	-519938.497	0.9477	0.0002
Structural steel worker	97.024	-191471.0778	0.932	0.0004
Manufacturing & industrial occupations				
Machinist	27.1198	-53465.4893	0.9722	0.0001
Inspector, floor	9.6946	-19125.2575	0.918	0.0007
Inspector, garag	5.4192	-10664.8623	0.9238	0.0006
Inspector, general	9.0359	-17798.6168	0.943	0.0003
Set-up man (job setter)	39.7395	-78278.7784	0.9226	0.0006
Engine lathe set-up operator	13.5928	-26794.6766	0.967	0.0001
Turret lathe set-up operator	14.2814	-28129.6647	0.9671	0.0001
Milling machine set-up operator	10.9341	-21548.0359	0.9846	0.0001
Grinding machine operator	7.6946	-15162.2575	0.9572	0.0001
Drill press operator	5.5479	-10934.1557	0.8827	0.0017
Fourcault machine production crew	5.9072	-11627.3234	0.9294	0.0005
Furnace operator	2.5689	-5068.5988	0.9238	0.0006
Maintenance mechanic	31.3084	-61608.3772	0.9985	0.0001
Staionary engineer	3.1737	-6256.8144	0.9371	0.0003
Lay-out man	5.8234	-11483.5509	0.9477	0.0002

Table 11. (Continued)

Job title	Slope	Intercept	R^2	Prob.
Pattern maker, metal	13.479	-26533.5569	0.9431	0.0002
Pattern maker, metal, bench	2.8363	-5592.0898	0.9454	0.0002
Sheet metal worker	21.5329	-42395.982	0.9632	0.0001
Welder, gas	9.7665	-19258.491	0.9663	0.0001
Welder, arc	27.982	-55152.1916	0.9744	0.0001
Welder, combination	9.1527	-18001.3713	0.9851	0.0001
Welder, heliarc	1.7784	-3509.0299	0.8702	0.0022
Welding machine operator	2.1287	-4198.2934	0.9702	0.0001
Mechanical engineering technician	34.9012	-68836.0539	0.9677	0.0001
Instrumentation technician	27.3892	-54028.515	0.9642	0.0001
Draftsman, mechanical	6.482	-12782.1916	0.9594	0.0001
Painter, spray	13.6587	-26909.6407	0.983	0.0001
Finisher	3.7156	-7287.7006	0.972	0.0001
Chemical laboratory technician	2.2695	-4479.1257	0.9044	0.001
Business & office, including government occupations				
Secretary and stenographer	12.5299	-24721.3473	0.8603	0.0026
General clerk	105.4611	-207482.7485	0.9316	0.0004
Bookkeeping and accounting clerk	14.7036	-28986.1617	0.9871	0.0001
Library assistant	5.2814	-10417.6647	0.9729	0.0001
Purchasing agent	3.7036	-7311.1617	0.9772	0.0001
Photographer	4.485	-8838.8263	0.826	0.0046
Printing, publishing & allied occupations				
Foreman printing shop	6.6766	-13166.4491	0.94	0.0003
Off-set press man	2.8653	-5647.4371	0.871	0.0021
Multilith operator	2.8802	-5684.6108	0.8741	0.002
Job printer	3.8533	-7589.8982	0.9607	0.0001
Photographer (litho)	1.979	-3902.5569	0.8461	0.0033
Folding machine operator	1.997	-3939.3653	0.9074	0.0009
Commercial artist (illustrator)	1.524	-3008.0778	0.9104	0.0008

Table 11. (Continued)

Job title	Slope	Intercept	R^2	Prob.
Platen and letter pressman	2.2575	-4449.5868	0.9151	0.0007
Linotype operator	1.4491	-2858.2096	0.8251	0.0046
Compositor (typographer)	15.2275	-29992.2395	0.9383	0.0003
Linotype machinist	1.8832	-3715.2455	0.8933	0.0013
Bookbinder	5.4461	-10714.5748	0.9193	0.0006
Cutter operator	1.9371	-3820.6707	0.948	0.0002
Service occupations				
Refrigeration mechanic	1.3084	-2576.3772	0.9626	0.0001
Air conditioning mech. (commercial)	1.1198	-2204.3892	0.9518	0.0002
Air conditioning mech. (domestic)	1.1766	-2317.4491	0.9797	0.0001
Television & radio service repairman	5.006	-9866.2695	0.9758	0.0001
Electronics mechanic	4.8802	-9624.6108	0.9835	0.0001
Electronics technician	14.3443	-28313.994	0.9731	0.0001
Instrument repairman	0.8533	-1678.8982	0.9728	0.0001
Electric motor repairman	7.8922	-15563.1497	0.9591	0.0001
Electrician	198.9491	-392035.2096	0.9918	0.0001
Lineman	10.488	-20682.4617	0.9435	0.0003
Turbine and boiler operator	4.509	-8889.9042	0.9591	0.0001
Electro-mechanical technician	1.2455	-2457.0479	0.9386	0.0003

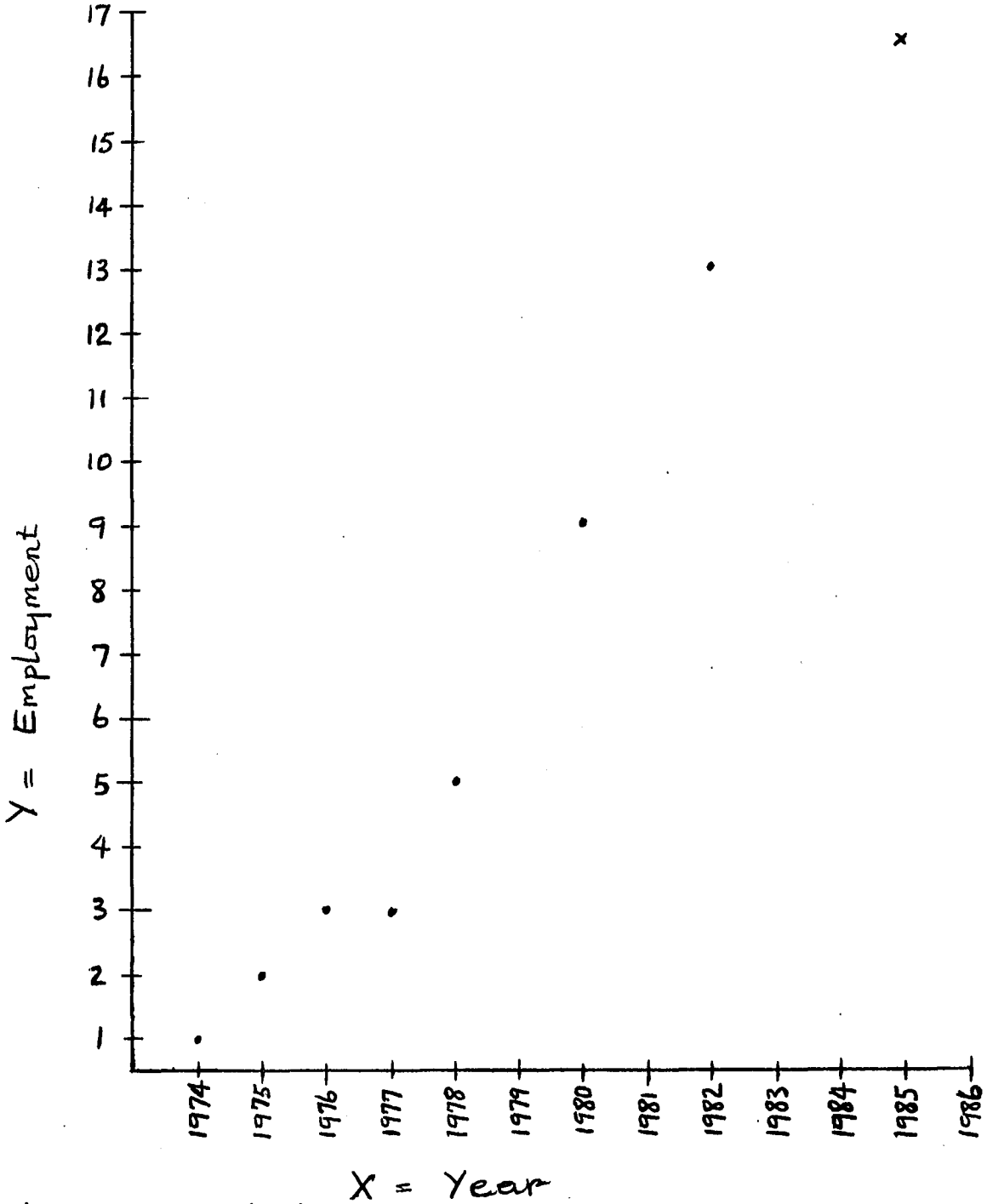

Figure 1. Predicting 1985 employment for "farm supervisor/ technician"; regression model: $Y = BX+C$
$Y = 1.5X + (-2960.9999)$;
$= 1.5(1985) - 2961 = 16.5$

Table 12. Projected number of workers that will be employed by job titles in agricultural and related occupations by 1985

Job titles	Number of workers employed in 19--					Anticipated employment in 19--		Projected employment by 1985
	74	75	76	77	78	80	82	
Meat dresser	-	-	6	10	18	27	36	51
Laboratory tester	40	43	43	42	44	48	54	57
Laboratory supervisor	6	7	7	6	10	15	18	22
Farm equipment mechanic	45	54	68	65	77	82	93	112
Farm equipment mech. helper	-	-	15	25	30	40	54	77
Farm mach. set-up man	3	4	4	4	8	8	11	14
Ag. mach. welder	4	7	13	17	22	25	30	42
Ag. feed mix specialist	-	-	1	1	2	4	5	7
Salesman grain & feed	3	3	3	4	5	7	12	14
Storage technician	-	-	1	1	2	2	3	4
Poultry technician	-	-	13	15	19	30	45	60
Truck driver, heavy	30	36	57	69	69	88	104	135
Nursery worker	10	10	9	11	12	15	20	22
Sprayer	20	24	25	25	30	40	45	54
Greens superintendent	-	-	12	13	21	24	28	42
Tree surgeon	3	3	3	3	3	11	13	16
Tree pruner	1	1	1	1	2	3	4	5
Farm supr./tech.	1	2	3	3	5	9	13	17
Bookkeeper	1	1	1	1	2	3	4	5
Total	167	195	285	316	381	481	592	756

that would be employed by each employer in each of the available job titles by 1985.

In Bendel State, 167 skilled and technician workers were employed in 1974 in agriculture. By 1978 the figure increased to 381 indicating a 128.14% total growth rate and a mean annual growth rate of 32.04%. By 1980, 481 skilled and technician workers were expected to be employed in agricultural and related occupations in Bendel State. The number was estimated to increase to 756 by 1982 and projected to be 756 by 1985.

The employment trend from 1974 to 1985 in mechanical (automotive) and diesel occupations was revealed by the data presented in Table 13. Most of the job titles in this occupational group had a gross growth rate of 200% and more for the entire study period of 8 years, excluding 1985. However, the rate of growth was not uniform for the entire period. The growth rate for the first four years was lower on the average than that obtained for the estimated employment for the last four years.

The total number of persons employed in mechanical (automotive) and diesel occupations in 1974 was 848. This number rose to 1,950 in 1978 and was expected to reach 2,507 by 1980 and 3,170 by 1982. The total number of skilled and technician workers projected to be in employment in the mechanical and diesel occupational groups by 1985 was 3,950, which revealed an increase of 2,000 more workers over the present number.

Table 13. Projected number of workers that will be employed by job titles in mechanical (automobile) and diesel occupations by 1985

Job titles	Number of workers employed in 19--					Anticipated employment in 19--		Projected employment by 1985
	74	75	76	77	78	80	82	
Automobile mechanic	87	119	155	186	243	287	355	460
Automobile tun-up mech.	13	18	15	20	27	45	67	80
Front end alignment man	15	11	15	20	26	34	51	61
Transmission mechanic	16	24	27	29	35	51	72	86
Brakeman, sutomobile	54	60	72	92	114	148	209	254
Auto air conditioning mech.	2	4	6	9	14	22	33	42
Automobile parts man	58	67	74	76	94	112	159	182
Tractor mechanic	9	9	11	13	20	36	58	69
Construction eq. mech.	44	46	54	60	112	130	145	195
Auto body repair	38	45	65	72	97	139	197	244
Auto spray painter	31	27	31	36	45	60	96	108
Auto maintenance mech.	22	29	36	42	55	81	110	137
Auto service sta. attend.	18	15	16	17	26	38	54	63
Fuel injection serv. man	4	4	6	9	13	29	32	44
Tire repairman	11	13	13	18	27	34	56	66
Gasoline eng. repairman (2- and 4-cycle)	4	6	9	9	13	27	42	51
Diesel mechanic	144	150	164	181	272	366	443	555
Trans. mech. (diesel)	6	6	9	13	16	23	29	38
Pipe fitter, diesel eng.	4	5	6	9	13	19	22	30
Tractor-trailer tr. dr.	76	254	301	294	308	389	434	568
Light truck driver	172	197	216	227	254	297	346	405
Bus driver[a]	20	100	120	123	126	140	160	212
Total	848	1209	1421	1555	1950	2507	3170	3950

[a]Job title supplied by employers.

In Table 14 is shown the projected number of workers that would be employed by job titles in construction occupations by 1985. Employment in construction occupations in Bendel State rose from a total of 2,735 skilled and technician workers in 1974 to 5,628 workers in 1978, showing an increase of 2,893 skilled and technician workers at the average rate of 26.49% per year. In 1980 the number was expected to increase to 7,192, and 9,295 by 1982, while the projected employment by 1985 would be 11,562.

Apart from the construction worker, the only job titles which had 1000 skilled and technician workers and more in 1978 was carpentry. By 1980 and 1982, 1,638 and 1,945 skilled and technician workers would be employed as carpenters in Bendel State. The least number of workers was found in the job areas of house repairman, maintenance man, and construction estimating where 22 or fewer skilled workers were employed in 1974 and 56 or fewer in 1978.

No single job title in industrial and manufacturing occupations included 400 or more skilled and technician workers in 1978. The job area which employed the largest number of skilled and technician workers was set-up man (job setter) which employed 195 persons in the categories of skilled and technician workers in 1974 and 377 persons in 1978. The combined employment in 1974 in manufacturing and industrial was 1,377. This figure rose to 2,937 in 1978 giving a mean annual growth rate of 28.32%. The total number expected to be

Table 14. Projected number of workers that will be employed by job titles in construction occupation by 1985

Job titles	Number of workers employed in 19--					Anticipated employment in 19--		Projected employment by 1985
	74	75	76	77	78	80	82	
Heavy equip. or earth moving mach. opr. (e.g., bull-dozer, dragline, power shovel, etc.)	102	116	124	112	174	228	293	350
Carpenter foreman	30	44	70	98	148	174	260	340
Carpenter	726	816	982	1210	1462	1638	1945	2452
Floor layer	170	176	196	220	217	224	293	318
Roofer	110	314	338	376	395	452	590	733
House repairman	12	16	24	36	42	52	90	109
Maintenance man	20	33	34	37	49	60	97	113
Plumbing (plumber & pipe fitter)	65	76	106	139	174	208	254	333
Bricklayer, mason	340	353	392	441	432	528	587	680
Concrete work foreman	38	42	58	84	130	172	260	327
Concreting mach. opr. dr.	142	168	234	256	306	414	482	620
Plasterer (rendering)	314	296	332	360	390	430	495	559
Draftsman, architectural	40	44	47	56	96	129	177	221
Draftsman, electrical	36	43	46	51	98	130	161	209
Estimator	22	22	26	26	56	78	94	123
Construction worker	421	451	483	542	1047	1635	2321	2954
Structural steel worker	147	188	205	220	412	640	896	1121
Total	2735	3198	3697	4264	5628	7192	9295	11562

employed by 1980 was 3,609. By 1982 the total employment might rise to 4,216. Projection for 1985 showed that 5,341 trained persons in the two categories of skilled and technician workers would be employed in manufacturing and industrial occupations in Bendel State (see Table 15 for detailed findings).

Table 16 summarily presents the findings on employment trends from 1974 to 1978 and then indicates projection to 1985 in business and office including government occupations. The job area of "general clerk" accounted for over 50% of the total employment in business and office occupations.

The total employment in 1974 in the business and office cluster was 641, while general clerks alone had 549 workers. These figures rose to 1,395 for the whole occupational group in 1978, and 1,183 for general clerk only in the same year. The number expected to be in employment in 1980 and 1982 in the business occupational cluster was 1,617 and 1,924, respectively. One hundred and fifty-one employees in the job titles of secretary and stenographer were predicted for 1985, whereas 1,857 general clerks were predicted to be in employment in the same year. The mean annual growth rate for secretary and stenographer, general clerk, bookkeeping and accountant was 14.29, 28.87, and 57.26%, respectively.

The data presented in Table 17 reveal that 215 skilled and technician workers were employed in five printing, publishing and allied establishments in 1974 in Bendel State.

Table 15. Projected number of workers that will be employed by job titles in manufacturing and industrial occupation by 1985

Job titles	Number of workers employed in 19--					Anticipated employment in 19--		Projected employment by 1985
	74	75	76	77	78	80	82	
Machinist	84	91	112	135	184	249	279	367
Inspector, floor	15	16	27	36	68	68	86	118
Inspector, gage	31	42	46	40	56	68	75	92
Inspector, general	41	48	49	60	82	100	105	138
Set-up man (job setter)	195	196	214	249	377	420	472	604
Eng. lathe set-up opr.	36	45	69	73	104	123	139	187
Turret lathe set-up opr.	49	82	99	108	116	151	171	219
Milling mach. set-up opr.	39	45	52	69	83	106	120	156
Grinding mach. opr.	21	42	42	46	62	73	87	112
Drill press operator	15	22	27	31	52	51	57	78
Fourcault mach. prod. crew[a]	38	40	47	47	49	70	85	98
Furnace operator[a]	5	5	7	9	9	18	25	31
Maintenance mechanic	189	225	261	292	321	382	442	539
Stationary engineer	6	9	15	21	23	27	31	43
Lay-out man	12	18	19	27	42	49	55	76
Pattern maker, metal	81	72	99	124	131	158	177	222
Pattern maker, metal, bench	3	9	13	14	13	22	28	36
Sheet metal worker	105	139	150	189	175	249	280	347
Welder, gas	18	33	40	51	59	78	99	128
Welder, arc	76	114	141	162	223	240	306	352
Welder, combination	67	76	82	91	108	117	141	167
Welder, heliarc	4	4	5	4	7	12	18	21
Welding machine operator	3	7	9	10	12	15	22	27

[a]Job titles supplied by employers.

Table 15. (Continued)

Job titles	Number of workers employed in 19--					Anticipated employment in 19--		Projected employment in 1985
	74	75	76	77	78	80	82	
Mechanical engineering technician	83	92	123	135	188	288	341	442
Instrumentation tech.	40	56	85	112	177	209	243	339
Draftsman, mechanical	18	22	22	27	39	54	67	85
Painter, spray	54	73	78	87	106	130	168	203
Finisher[a]	46	48	57	59	62	70	75	88
Chemical laboratory technician	3	4	4	6	9	12	22	26
Total	1377	1675	1994	2314	2937	3609	4216	5341

Table 16. Projected number of workers that will be employed by job titles in business and office including government occupation by 1985

Job titles	Number of workers employed in 19--					Anticipated employment by 19--		Projected employment by 1985
	74	75	76	77	78	80	82	
Secretary and stenographer	28	31	35	40	44	79	133	151
General clerk (typist, receptionist, telephone opr., general clerk, and duplicating machine operator)	549	892	958	1026	1183	1305	1500	1857
Bookkeeping and account (shipping and receiving clerk, stock clerk, accounting clerk, billing machine opr., bookkeeper, calculating machine opr., statistical clerks and compilers)	31	58	71	81	102	129	152	200
Library assistant	9	14	21	20	27	38	53	66
Purchasing agent	2	4	5	9	14	23	30	40
Photographer	22	22	20	22	25	43	56	64
Total	641	1021	1110	1198	1395	1617	1924	2378

Table 17. Projected number of workers that will be employed by job titles in printing, publishing and allied occupations by 1985

Job titles	Number of workers employed in 19--					Anticipated employment by 19--		Projected employment by 1985
	74	75	76	77	78	80	82	
Foreman printing shop	20	20	25	28	37	50	73	87
Off-set pressman	12	13	14	12	18	25	35	40
Multilith operator	5	5	5	7	9	17	28	33
Job printer	20	20	22	27	31	38	50	59
Photographer (litho)	7	7	7	8	9	15	23	26
Folding mach. operator	5	5	6	8	8	14	21	25
Commercial artist (illustrator)	2	2	3	3	5	9	14	17
Platen and letter pressman	9	10	10	12	13	20	27	32
Linotype operator	4	5	5	3	7	12	15	18
Compositor (typographer)	80	85	95	105	109	160	200	234
Linotype machinist	4	5	6	6	8	12	20	23
Bookbinder	42	43	45	48	52	68	85	96
Cutter operator	5	5	7	8	9	15	20	25
Total	215	225	250	275	315	455	611	715

By 1978, the total employment rose to 315 showing an increase of only 100 workers at an average growth rate of 11.64% per year. The table further shows a projected total employment of 715 workers in the two grade levels of skilled and technician workers by 1985, revealing an increase of 400 employees over the 1978 level.

Table 18 summarizes the findings relating to the projected number of skilled and technician level workers that would be employed in service occupations by 1985. As in business and office including government occupations, the job area titled "electrician" accounted for 86.16% of the total number of workers employed in service occupations in 1974 and 80.15% of the number that would be employed in 1985. The total employment in 1974 was 860 and by 1978, 1,860 skilled and technician workers were employed, revealing an average growth rate of 29.07% per year. However, the mean growth rate between 1978 and 1985 would be 23.28% as the projected total number of employees for 1985 would be 3,592.

Number of Skilled and Technician Workers Needed to be Trained in the 8-Year Period Between 1978 and 1985

Tables 19 through 25 present the findings relating to the number of workers needed to be trained by 1978, 1980, 1982, and 1985 on the basis of the demand for skilled and technician workers in each of the available job titles in all

Table 18. Projected number of workers that will be employed by job titles in service occupation by 1985

Job titles	Number of workers employed in 19--					Anticipated employment by 19--		Anticipated employment by 1985
	74	75	76	77	78	80	82	
Refrigeration mechanic	7	8	9	9	11	15	17	21
Air conditioning mech. (commercial)	7	7	8	9	10	12	16	18
Air conditioning mech. (domestic)	5	7	8	8	10	12	15	18
TV & radio serv. & repairman	16	21	23	29	40	45	55	71
Electronics mechanic	8	15	20	23	29	35	50	63
Electronics technician	-	27	26	34	62	90	117	159
Instrument repairman	5	7	7	8	9	11	12	15
Electric motor repairman	15	24	28	38	57	65	75	103
Elect. appl. repairman	9	12	12	13	17	20	29	34
Electrician	741	898	1044	1245	1522	1817	2340	2879
Lineman	31	33	38	46	55	81	114	136
Turbine & boiler opr.[a]	14	15	19	21	30	35	50	60
Electro-mechanical tech.	2	3	3	5	8	8	12	15
Total	860	1077	1245	1488	1860	2246	2902	3592

[a]Job title supplied by employer.

the seven occupational areas covered in the survey. In all the seven occupational areas, an attempt was made to group related job titles for purposes of instruction. Hence, for each group of related job titles an occupational instructional program was specified for the objective of using these as an instructional base for preparing workers who will function in any one or group of related job titles listed beneath each proposed course.

Column headings of tables in this section included proposed courses to train workers for the job titles listed; 1978 employment; current number of expatriates, vacancies, total; anticipated employment by 19--: 80, 82, and 85; increased employment over 19--: 78, 80 and 82 levels; 19--: 80, 82, 85; labor turnover; mean annual % employers estimated; and number of workers needed to be trained by: 1978, 1980, 1982, 1985, total. The number of workers required to be trained by 1978 was obtained by summing the current number of expatriates employed and vacancies in 1978, while the number of workers required to be trained by 1980, 1982, and 1985 was obtained by adding similar columns relating to each of the three years under the columns titled: increased employment over 1978, 1980 and 1982 levels, and labor turnover, mean annual % employees estimated--1980, 1982 and 1985.

Increased employment over 19--: 78, 80, and 82 levels for the years 1980, 1982 and 1985 was obtained by subtracting 1978 employment from 1980 anticipated employment, subtracting

Table 19. Workers needed to be trained by occupational instructional programs and job titles by 1978, 1980, 1982 and 1985 in agricultural and related occupations

Proposed courses to train workers for the job titles listed below	1978 employment	Current number of: Expatriates	Vac.	Total	Anticipated employment by 19-- 80	82	85
Food processing							
1. Meat dresser	18	0	7	7	27	36	51
2. Lab tester	44	15	0	15	48	54	57
3. Lab supr.	10	0	1	1	15	18	22
Subtotal	72	15	8	23	90	108	130
Agricultural machinery							
1. Farm eqt. mech.	77	7	1	8	82	93	112
2. Farm eqt. mech. hlpr.	30	0	0	0	40	54	77
3. Farm mach. set-up man	8	2	0	2	8	11	14
4. Ag mach. welder	22	4	0	4	25	30	42
Subtotal	137	13	1	14	155	188	245
Feed and seed service							
1. Ag. feed mix spec.	2	0	1	1	4	5	7
2. Salesman grain & feed	5	0	0	0	7	12	14
3. Storage tech.	2	0	0	0	2	3	4
4. Nursery	12	2	16	18	15	20	22
5. Sprayer	30	4	9	13	40	45	54
Subtotal	51	6	26	32	68	85	101
General agriculture							
1. Greens supt.	21	2	9	11	24	28	42
2. Tree surgeon	3	0	8	8	11	13	16
3. Tree pruner			2	2	3	4	5
4. Farm supr./tech.	5	0	0	0	9	13	17
Subtotal	31	2	19	21	47	58	80
Not grouped							
1. Poultry tech.	19	0	12	12	30	45	60
2. Truck dvr., heavy	69	0	11	11	88	104	135
3. Bookkeeper	2	0	1	1	3	4	5
Subtotal	90	0	24	24	121	153	200
Total	381	36	78	114	481	592	756

Increased employment over 78, 80, and 82 levels			Labor turnover: Mean annual % employers estimated				Number needed to be trained by				
19--				Number by 19--				19--			
80	82	85	%	80	82	85	1978	80	82	85	Total
9	9	15	20	7	11	22	7	16	20	37	80
4	6	3	15	13	14	24	15	17	20	27	79
5	3	4	10	2	3	5	1	7	6	9	23
18	18	22		22	28	51	23	40	46	73	182
5	11	19	7.4	11	12	21	8	16	23	40	87
10	14	23	20	12	16	32	0	22	30	55	107
0	3	3	25	4	4	8	2	4	7	11	24
3	5	12	15	7	8	14	4	10	13	26	53
18	33	57		34	40	75	14	52	73	132	271
2	1	2	-	0	0	0	1	2	1	2	6
2	5	2	33	3	5	12	0	5	10	14	29
0	1	1	-	0	0	0	0	0	1	1	2
3	5	2	30	7	9	18	18	10	14	20	62
10	5	9	16.17	10	13	22	13	20	18	31	82
17	17	16		20	27	52	32	37	44	68	181
3	4	14	15	6	7	13	11	9	11	27	58
8	2	3	-	0	0	0	8	8	2	3	21
1	1	1	-	0	0	0	2	1	1	1	5
4	4	4	-	0	0	0	0	4	4	4	12
16	11	22		6	7	13	21	22	18	34	91
11	15	15	10	4	6	14	12	15	21	29	77
19	16	31	12.33	17	22	38	11	36	38	69	154
0	1	1	-	0	0	0	1	1	1	1	4
31	32	47		21	28	52	24	52	60	99	235
100	111	164		103	130	243	114	203	241	407	965

Table 20. Workers needed to be trained by occupational instructional programs and job titles by 1978, 1980, 1982 and 1985 in mechanical (automotive) and diesel occupations

Proposed courses to train workers for the job titles listed below	1978 employment	Current number of: Expatriates	Vac.	Total	Anticipated employment by 19-- 80	82	85
Automotive mechanic							
1. Auto mech.	243	0	13	13	287	355	460
2. auto tune-up mech.	27	0	0	0	45	67	80
3. Front-end align.man	26	0	2	2	34	51	61
4. Transmission mech.	35	0	0	0	51	72	86
5. Brakeman, auto	114	0	11	11	148	209	254
6. Auto air cond. mech.	14	0	2	2	22	3	42
7. Auto parts man	94	0	6	6	112	159	182
8. Tractor mech.	20	0	0	0	36	58	69
9. Constr. eqmt. mech.	112	16	2	18	130	145	195
Subtotal	685	16	36	52	865	1149	1429
Automobile body repair							
1. Auto body repair	97	0	6	6	139	197	244
2. Auto spray painter	45	0	11	11	60	96	108
Subtotal	142	0	17	17	199	293	352
Automobile servicing							
1. Auto maint. mech.	55	0	2	2	81	110	137
2. Auto serv. Sta. atd.	26	0	4	4	38	54	63
3. Fuel inj. serv. man	13	0	6	6	29	32	44
4. Tire repairman	27	0	6	6	34	56	66
Subtotal	121	0	18	18	182	252	310
Diesel and equipment maintenance							
1. Gas eng. repairman (2- and 4-cycle)	13	0	4	4	27	42	51
2. Diesel mech.	272	15	15	30	366	443	555
3. Trans. mech. (dies.)	16	0	14	14	23	29	38
4. Pipe fitter, ds. eng.	13	0	2	2	19	22	30
5. Subtotal	314	15	35	50	435	536	674
Not grouped							
1. Trt.-tlr. tr. drv.	308	0	22	22	389	434	568
2. Lt. trk. driver	254	0	2	2	297	396	405
3. Bus driver[a]	126	0	10	10	140	160	212
Subtotal	688	0	34	34	826	940	1185
Total	1950	31	140	171	2507	3170	3950

[a] Job title supplied by employer.

Increased employment over 78, 80, and 82 levels			Labor turnover: Mean annual % employers estimated				Number needed to be trained by				
	19--			Number by 19--				19--			
80	82	85	%	80	82	85	1978	80	82	85	Total
44	68	105	10	49	57	107	13	93	125	212	443
18	22	13	20	11	18	40	0	29	40	53	122
8	17	10	10	5	7	15	2	13	24	25	64
16	21	14	20	14	20	43	0	30	41	57	128
34	61	5	10	23	30	63	11	57	91	68	227
8	11	9	30	8	13	30	2	16	24	39	81
18	47	23	20	38	45	94	6	56	92	117	271
16	22	11	20	8	14	35	0	24	36	46	106
18	15	50	20	45	52	87	18	63	67	137	285
180	284	240		201	256	514	52	381	540	754	1727
42	58	47	15	29	42	89	6	71	100	136	313
15	36	12	20	18	24	58	11	33	60	70	174
57	94	59		47	66	147	17	104	160	206	487
26	29	27	22.5	25	36	74	2	51	65	101	219
12	16	9	5	3	4	8	4	15	20	17	56
16	3	12	25	7	15	24	6	23	18	36	83
7	22	10	25	13	17	42	6	20	39	52	117
61	70	58		48	72	148	18	109	142	206	475
14	15	9	15	4	8	19	4	18	23	28	73
94	77	112	12.5	68	92	166	30	162	169	278	639
7	6	9	16.17	5	7	14	14	12	13	23	62
6	3	8	10	3	4	7	2	9	7	15	33
121	101	138		80	111	206	50	201	212	344	807
81	45	134	25	154	195	326	22	235	240	460	957
43	49	59	20	102	119	208	2	145	168	267	582
14	20	52	25	63	70	120	10	77	90	172	349
138	114	245		319	384	654	34	457	498	899	1888
557	663	740		695	889	1669	171	1252	1552	2409	5384

Table 21. Workers needed to be trained by occupational instructional programs and job titles by 1978, 1980, 1982 and 1985 in construction occupations

Proposed courses to train workers for the job titles listed below	1978 employment	Current number of: Expatriates	Vac.	Total	Anticipated employment by 19-- 80	82	85
Heavy equipment or earth moving machines opr. (bulldozer, dragline, and power shovel)	174	0	12	12	228	293	350
Carpentry							
1. Carpenter frmn.	148	0	10	10	174	260	340
2. Carpenter	1462	0	114	114	1638	1945	2452
3. Floor layer	217	0	30	30	224	293	318
4. Roofer	395	24	90	114	452	590	733
5. House repairman	42	0	5	5	52	90	109
6. Maintenance man	49	0	10	10	60	90	113
Subtotal	2313	24	259	283	2600	3275	4064
Plumbing (plumbing and pipe fitter)	174	16	12	28	208	254	333
Brick-block-concrete training							
1. Bricklayer, mason	432	0	62	62	528	587	680
2. Concrete work, frmn.	130	6	0	6	172	260	327
3. Concreting mach. opr./driver	306	22	38	60	414	482	620
4. Plasterer (rendering)	390	0	4	4	430	495	559
Subtotal	1258	28	104	132	1544	1824	2186
Not grouped							
1. Construction wkr.	1047	4	6	10	1635	2321	2954
2. Struct. steel wkr.	412	100	12	112	640	896	1121
Subtotal	1459	104	18	122	2275	3217	4075
Total	5378	172	405	577	6855	8863	11009

Increased employment over 78, 80, and 82 levels			Labor turnover: Mean annual % employers estimated				Number needed to be trained by				
	19--			Number by 19--				19--			
80	82	85	%	80	82	85	1978	80	82	85	Total
54	65	57	18.5	64	84	163	12	118	149	220	449
26	86	80	14.7	44	51	115	10	70	137	195	412
176	307	507	10	292	328	584	114	468	635	1091	2308
7	69	25	14	61	63	123	30	68	132	148	378
57	138	143	7.8	62	71	138	114	119	209	281	723
10	38	19	7.66	6	8	21	5	16	46	40	107
11	37	16	11.33	11	14	33	10	22	51	49	132
287	675	790		476	535	1014	283	763	1210	1804	4060
34	46	79	8	28	33	61	28	62	79	140	309
96	59	92	14	121	148	247	62	217	207	340	826
42	88	67	23.46	61	81	183	6	103	169	250	528
108	68	138	16.4	100	136	237	60	208	204	375	847
40	65	64	17	133	146	252	4	173	211	316	704
286	280	362		415	511	919	132	701	791	1281	2905
588	686	631	13.5	282	442	940	10	870	1128	1571	3579
228	256	225	16.25	134	208	437	112	262	464	662	1600
816	942	856		416	650	1377	122	1232	1592	2233	5179
1477	2008	2144		1399	1813	3534	577	2876	3821	5678	12952

Table 22. Workers needed to be trained by occupational instructional programs and job titles by 1978, 1980, 1982 and 1985 in manufacturing and industrial occupations

Proposed courses to train workers for the job titles listed below	1978 employment	Current number of: Expatriates	Vac.	Total	Anticipated employment by 19-- 80	82	85
Machinist, tool & die maker							
1. Machinist	184	7	70	77	249	279	367
2. Inspector, floor	68	19	0	19	68	86	118
3. Inspector, gage	56	2	4	6	68	75	92
4. Inspector, gen.	82	22	0	22	100	105	138
5. Set-up man (jobsetter)	377	22	12	34	420	472	604
Subtotal	767	72	86	158	905	1017	1319
Machine operator							
1. Eng. lathe set-up opr.	104	16	3	19	123	139	187
2. Turret lathe set-up opr.	116	11	18	29	151	171	219
3. Milling mach. set-up opr.	83	0	4	4	106	120	156
4. Grinding mach. opr.	62	0	10	10	73	87	112
5. Drill press opr.	52	5	0	5	51	57	78
6. Fourcault mach. production crew[a]	49	0	0	0	70	85	98
Subtotal	466	32	35	67	574	659	850
Pattern making							
1. Furnace operator[a]	9	0	5	5	18	25	31
Industrial mechanic							
1. Maintenance mech.	321	27	34	61	382	442	539
2. Stationary eng.	23	4	0	4	27	31	43
Subtotal	344	31	34	65	409	473	582
Sheet metal							
1. Lay-out man	42	9	3	12	49	55	76
2. Pattern mkr., metal	131	13	10	23	158	177	222
3. Pattern maker, metal, bench	13	0	0	0	22	28	36
4. Sheet metal wkr.	175	0	22	22	249	280	347
Subtotal	361	22	35	57	478	540	681

[a]Job title supplied by employer.

Increased employment over 78, 80, and 82 levels			Labor turnover: Mean annual % employers estimated				Number needed to be trained by				
	19--			Number by 19--				19--			
80	82	85	%	80	82	85	1978	80	82	85	Total
65	30	88	12	44	60	100	77	109	90	188	464
0	18	32	15	20	20	39	19	20	38	71	148
12	7	17	10	11	14	23	6	23	21	40	90
18	5	33	13.66	22	27	43	22	40	32	76	170
43	52	132	7.4	56	62	105	34	99	114	237	484
138	112	302		153	183	310	158	291	295	612	1356
19	16	48	16.66	33	41	69	19	54	57	117	247
35	20	48	14.66	34	44	75	29	69	64	123	285
23	14	336	10	17	21	36	4	40	35	72	151
11	14	25	7.5	9	11	20	10	20	25	45	100
0	6	21	10	10	10	17	5	10	16	38	69
21	15	13	5	5	7	13	0	26	22	26	74
109	85	191		110	134	230	67	219	219	421	926
9	7	6	5	1	2	4	5	10	9	10	34
61	60	97	15.2	98	116	202	61	159	176	299	695
4	4	12	30	14	16	28	4	18	20	40	82
65	64	109		112	132	230	65	177	196	339	777
7	6	21	10	8	10	17	12	15	16	38	81
27	19	45	6.5	17	21	35	23	44	40	80	187
9	6	8	12.5	3	6	11	0	12	12	19	43
74	31	67	15.5	54	77	130	22	128	108	197	455
117	62	141		82	114	193	57	199	176	334	766

Table 22. (Continued)

Proposed courses to train workers for the job titles listed below	1978 employ-ment	Current number of: Expa-triates	Vac.	Total	Anticipated employment by 19-- 80	82	85
Welding							
1. Welder, gas	59	5	10	15	78	99	128
2. Welder, arc	223	3	13	16	240	306	352
3. welder, combination	108	15	7	22	117	141	167
4. Welder, heliarc	7	0	2	2	12	18	21
5. Welding mach. opr.	12	0	2	2	15	22	27
Subtotal	409	23	34	57	462	586	695
Mechanical technology							
1. Mech. eng. tech.	188	13	27	40	288	341	442
2. Instr. tech.	177	31	46	77	209	243	339
Subtotal	365	44	73	117	497	584	781
Construction design & graphic drawing							
1. Draftsman, arch.	96	10	2	12	129	177	221
2. Draftsman, elect.	98	8	10	18	130	161	209
3. Draftsman, mech.	39	3	7	10	54	67	85
4. Estimator	56	12	10	22	78	94	123
Subtotal	289	33	29	62	391	499	638
Finishing							
1. Finisher	62	0	0	0	70	75	88
2. Painter, spray	106	6	6	12	130	168	203
Subtotal	168	6	6	12	200	243	291
Not grouped							
1. Chem. Lab tech.	9	1	0	1	12	22	26
Total	3187	264	337	601	3946	4648	5894

Increased employment over 78, 80, and 82 levels			Labor turnover: Mean annual % employers estimated				Number needed to be trained by				
	19--			Number by 19--				19--			
80	82	85	%	80	82	85	1978	80	82	85	Total
19	21	29	14	17	22	42	15	36	43	71	165
17	66	46	20	89	96	184	16	106	162	230	514
9	24	26	12.5	27	29	53	22	36	53	79	190
5	6	3	25	4	6	14	2	9	12	17	40
3	7	5	12.5	3	4	8	2	6	11	13	32
53	124	109		140	157	301	57	193	281	410	941
100	53	101	13.5	51	78	138	40	151	131	239	561
32	34	96	17	60	71	124	77	92	105	220	494
132	87	197		111	149	262	117	243	236	459	1055
33	48	44	20	38	52	106	12	71	100	150	333
32	31	48	20	39	52	97	18	71	83	145	317
15	13	18	20	16	22	40	10	31	35	58	134
22	16	29	5	6	8	14	22	28	24	43	117
102	108	139		99	134	257	62	201	242	396	901
8	5	13	10	12	14	23	0	20	19	36	75
24	38	35	12.5	27	33	63	12	51	71	98	232
32	43	48		39	47	86	12	71	90	134	307
3	10	4	24	4	6	16	1	7	16	20	44
760	702	1246		851	1058	1889	601	1611	1760	3135	7107

Table 23. Workers needed to be trained by occupational instructional programs and job titles by 1978, 1980, 1982 and 1985 in printing, publishing and allied occupations

Proposed courses to train workers for the job titles listed below	1978 employment	Current number of: Expatriates	Vac.	Total	Anticipated employment by 19-- 80	82	85
Photo offset printing							
1. Foreman, prtg. shop	37	0	9	9	50	73	87
2. Offset pressman	18	0	7	7	25	35	40
3. Multilith opr.	9	0	5	5	18	28	33
4. Job printer	31	0	5	5	38	50	59
5. Photographer (litho)	9	0	6	6	15	23	26
6. Folding mach. opr.	8	0	3	3	14	21	25
7. Commercial artist (illustrator)	5	0	3	3	9	14	17
Subtotal	117	0	38	38	168	244	287
Letter press printer							
1. Platen and letter pressman	13	0	5	5	20	27	32
2. Linotype operator	7	0	4	4	12	15	18
3. Compositor (typogr.)	109	0	21	21	160	200	234
4. Linotype mach.	8	0	5	5	12	20	23
5. Bookbinder	52	0	11	11	68	85	96
Subtotal	189	0	46	46	272	347	403
Not grouped							
1. Cutter opr.	9	0	12	12	15	20	25
Total	315	0	96	96	455	611	715

Increased employment over 78, 80, and 82 levels			Labor turnover: Mean annual % employers estimated				Number needed to be trained by				
	19--			Number by 19--				19--			
80	82	85	%	80	82	85	1978	80	82	85	Total
13	23	14	10	7	10	22	9	20	33	36	98
7	10	5	20	7	10	21	9	14	20	26	67
8	11	5	25	5	9	21	5	13	20	26	64
7	12	9	20	12	15	30	5	19	27	39	90
6	8	3	10	2	3	7	6	8	11	10	35
6	7	4	3	5	9	21	3	11	16	25	55
4	5	3	20	2	4	8	3	6	9	11	29
51	76	43		40	60	130	38	91	136	173	438
7	7	5	20	5	8	16	5	12	15	21	53
5	3	3	25	4	6	11	4	9	9	14	36
51	40	34	20	44	64	120	21	95	104	154	374
4	8	3	12.5	2	3	8	5	6	11	11	33
16	17	11	10	10	14	26	11	26	31	37	105
83	75	56		65	95	181	46	148	170	237	601
6	5	5	16.17	3	5	10	12	9	10	15	46
140	156	104		108	160	321	96	241	316	425	1085

Table 24. Workers needed to be trained by occupational instructional programs and job titles by 1978, 1980, 1982 and 1985 in business and office including government occupations

Proposed courses to train workers for the job titles listed below	1978 employment	Current number of: Expatriates	Vac.	Total	Anticipated employment by 19-- 80	82	85
Secretarial science							
1. Sec. & Steno.	44	0	56	56	79	133	151
General clerical							
1. General clerk (typist, recept., telephone opr., general clerk, & dupl. mach. opr.)	1183	0	195	195	1305	1500	1857
General accounting (bookkeeping and account)							
1. Shipping and rec. clerk, stock clk., billing mach. opr., bookkeeper, calc. mach. opr., stat. clerks & compilers)	102	0	4	4	129	152	200
Not grouped							
1. Library asst.	27	0	11	11	38	53	66
2. Purch. agent	14	0	2	2	23	30	40
3. Photographer	25	0	16	16	43	56	64
Subtotal	66	0	29	29	104	139	170
Total	1395	0	284	284	1617	1924	2378

Increased employment over 78, 80, and 82 levels			Labor turnover: Mean annual % employers estimated				Number needed to be trained by				
	19--			Number by 19--					19--		
80	82	85	%	80	82	85	1978	80	82	85	Total
35	54	18	11.48	10	18	46	56	45	72	64	237
122	195	357	98.13	232	256	442	195	354	451	799	1799
27	23	48	6.98	14	18	32	4	41	41	80	166
11	15	13	12.5	7	10	20	11	18	25	33	87
9	7	10	25	7	12	23	2	16	19	33	70
18	13	8	20	10	17	34	16	28	30	42	116
38	30	31		24	39	77	29	62	74	108	273
222	307	454		280	331	597	284	502	638	1051	2475

Table 25. Workers needed to be trained by occupational instructional programs and job titles by 1978, 1980, 1982 and 1985 in service occupations

Proposed courses to train workers for the job titles listed below	1978 employment	Current number of: Expatriates	Vac.	Total	Anticipated employment by 19-- 80	82	85
Conditioned air							
1. Refrig. mech.	11	0	5	5	15	17	21
2. Air conditioning mech. (com.)	10	0	2	2	12	16	18
3. Air conditioning mech. (dom.)	10	0	0	0	12	15	18
Subtotal	31	0	7	7	39	48	57
Electronic service							
1. TV & radio serv. & repairman	40	4	0	4	45	55	71
2. Elect. mech.	29	0	6	6	35	50	63
3. Elect. tech.	62	19	21	40	90	117	159
4. Instr. repairman	9	0	0	0	11	12	15
Subtotal	140	23	27	50	181	234	308
General electrical							
1. Elec. motor repman.	57	5	7	12	65	75	103
2. Elec. appl. repman.	17	0	0	0	20	29	34
3. Electrician	1522	21	73	94	1817	2340	2879
4. Line man	55	6	10	16	81	114	136
5. Turbine & boiler opr.	30	2	2	4	35	50	60
6. Electro-mechanical tech.	8	1	0	1	8	12	15
Subtotal	1689	35	92	127	2026	2620	3227
Total	1860	58	126	184	2246	2902	3592

Increased employment over 78, 80, 82 levels			Labor turnover: Mean annual % employers estimated				Number needed to be trained by				
	19--			Number by 19--				19--			
80	82	85	%	80	82	85	1978	80	82	85	Total
4	2	3	12	3	4	6	5	7	6	9	27
2	4	2	33	7	8	16	2	9	12	18	41
2	3	3	12	2	3	5	0	4	6	8	18
8	9	8		12	15	27	7	20	24	35	86
5	10	16	20	16	18	33	4	21	28	49	102
6	15	13	25	15	18	38	6	21	33	51	111
28	27	42	10	12	18	35	40	40	45	77	202
2	1	3	25	5	6	9	0	7	7	12	26
41	53	74		48	60	115	50	89	113	189	441
8	10	28	15	17	20	34	12	25	30	62	129
3	9	5	10	3	4	9	0	6	13	14	33
295	523	539	10	30	36	70	94	325	559	609	1587
26	33	22	20	22	32	68	16	48	65	90	219
5	15	10	25	15	18	38	4	20	33	48	105
0	4	3	25	4	4	9	1	4	8	12	25
337	594	607		91	114	228	127	428	708	835	2098
386	656	689		151	189	370	184	537	845	1059	2625

anticipated employment for 1980 from 1982 and subtracting 1982 anticipated employment from 1985 projected employment.

Table 19 summarizes the data which yielded information pertaining to the number of workers needed to be trained in each proposed occupational instructional program in agricultural and related occupations by 1978, 1980, 1982 and 1985. A total of 114 workers were needed to be trained in 1978 in four proposed courses and in the three job titles (poultry technician; truck driver, heavy; and bookkeeper) that could not be grouped into any of the four proposed courses. The table further reveals an additional need for 203 workers to be trained by 1980, 241 by 1982, and 407 by 1985, showing an overall need for a total of 965 skilled and technician workers to be trained by 1985. Employee turnover estimated by employers ranges between 7.4% and 33% per year in the agricultural and related occupations cluster.

Four courses were also proposed for training the total number of workers required to fill current and projected vacancies in mechanical (automobile) and diesel occupations. Three job titles were not grouped and should be taught as electives under the general title of "driver education" (see Table 20). Excluding the demand for 34 trained drivers, a total of 137 skilled and technician workers were needed to be trained in 19 job titles in 1978. Moreover, the table shows a need for an additional 795 and 1,054 trained workers, respectively, by 1980 and 1982, excluding drivers. The

projected need for 1985 was for 1,510 skilled and technician workers. The greatest need for trained workers was in the area of automotive mechanic which revealed a total need for 1,727 skilled and technician workers to be trained by 1985. With the exception of automobile air conditioning mechanic where the mean annual labor turnover was estimated at 30%, the labor turnover rate for automotive and diesel occupations estimated by employers ranges between 10% and 25% per year.

Table 21 contains the data which summarized the findings relating to the manpower need in construction occupations by 1978, 1980, 1982 and 1985. The training need in 1978 was for 577 workers in four proposed course areas and two ungrouped job titles. By 1980, 1982 and 1985, the expected number of additional skilled and technician workers would be 2,876, 3,821 and 5,678, respectively. Thus, a total of 12,952 workers would be needed to be trained by 1985. The need for trained workers was greatest in the instructional area of carpentry where 4,060 skilled and technician workers would be needed by 1985. The highest average rate of employee turnover of 23.46% per year was estimated for concrete work foreman. Apart from this job title no other job title had up to 20% yearly turnover rate. The turnover rate ranges between 7.66% and 18.5% per year.

The data presented in Table 22 yield information concerning the need for additional trained workers in manufacturing and industrial occupations by 1978, 1980, 1982 and

1985. The data reveal that by 1985 a total of 7,107 additional skilled and technician workers would be needed for various positions in manufacturing and industrial establishments in Bendel State. Out of the 7,107 workers, 601 were needed for immediate employment. For the purpose of training these workers, 9 programs or courses were proposed. These included machinist--tool and die maker, machine operator, pattern making, industrial mechanic, sheet metal, welding, mechanical technology, construction design and graphic drawing, and finishing. The greatest need was found to be in the area of machinest--tool and die making, followed by mechanical technology, where over 1000 workers are needed to be trained by 1985 in each group. The estimated mean annual rate of labor turnover in manufacturing and industrial occupations varied widely. The lowest and highest rates were 5% and 30%, respectively, with 25% variability.

The need for additional trained workers in the categories of skilled and technician in the occupational area of printing, publishing and allied occupations is revealed in the data presented in Table 23. Only 96 trained workers were found to be needed for immediate employment in all the 13 existing occupational titles. However, the data reveal that an additional 241 workers would be needed for employment by 1980 in printing and allied occupations. Table 23 further reveals that there would be an additional need for 316 skilled and technician workers by 1982, and the total number

of workers needed to be trained would increase to 1,085 by 1985.

Labor turnover in the printing occupational area ranged between 10% and 25% per year with the exception of one job title (folding machine operator) where the estimated mean annual rate of turnover was 33%.

Table 24 reveals that 2,475 trained workers, distributed over the eight-year period, would be needed for employment between 1978 and 1985 in business, office and government occupations in Bendel State. The demand for trained workers increased from 284 in 1978 to 782 and 1,420 by 1980 and 1982. By 1985, 237 trained secretaries and stenographers would be needed for employment while the need for general clersk would be for 1,799 workers by 1985. For immediate employment only 56 secretaries and stenographers and 195 general clerks were needed. Moreover, the table reveals a relatively low employee turnover rate in the business and office occupational group. The highest estimated average turnover rate was 11.48% for secretary and stenographer. The lowest rate of 6.98% was estimated for general accounting.

The number of workers needed to be trained by occupational instructional programs in service occupations by 1978, 1980, 1982 and 1985 is revealed by data presented in Table 25. All the 13 occupational titles listed under service occupations were divided into three instructional areas titled conditioned air, electronic service, and general electrical.

Table 25 shows an immediate need for 127 trained skilled and technician workers in the subgroup of general electrical, whereas only 7 trained workers in conditioned air, and 50 electronic service workers were needed for immediate employment. Furthermore, the table reveals a need for 2,625 trained workers in service occupations by 1985, distributed over the eight-year period. The total immediate need was for 184 workers, while 537, and 845 additional workers would be needed by 1980 and 1982. The estimated mean annual rate of labor turnover ranges between 10 and 25%.

Net Training Need

Most of the establishments organize limited in-plant training programs to prepare their own workers, and this had been taken into consideration in designing this study. The public vocational-technical schools play a complementary role, since the graduates of the public schools' training programs are considered for employment only after the graduates of the company training programs have been placed.

Hence, what the public schools could and should consider in establishing new programs, or expanding the existing ones, should be the unmet training need by the various in-plant training programs established by the same employers for whom the schools are preparing workers.

The data presented in Tables 26 through 32 reveal the effort of the various employers in trying to meet their

Table 26. Net manpower demand by occupational instructional programs and existing job titles by 1978, 1980, 1982 and 1985 in agricultural and related occupations

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				Total
	78	80	82	85	78	80	82	85	78	80	82	85	
Food processing													
1. Meat dresser	7	16	20	37	0	0	0	0	7	16	20	37	80
2. Lab tester	15	17	20	27	0	0	0	0	15	17	20	27	79
3. Lab suprv.	1	7	6	9	0	0	0	0	1	7	6	9	23
Subtotal	23	40	46	73	0	0	0	0	23	40	46	73	182
Agric. machinery													
1. Farm eq. mech.	8	16	23	40	1	2	0	0	7	14	23	40	84
2. Farm eq. mech. helper	0	22	30	55	0	2	0	0	0	20	30	55	105
3. Farm mach. set-up man	2	4	7	11	0	0	0	0	2	4	7	11	24
4. Ag. mach. welder	4	10	13	26	0	0	0	0	4	10	13	26	53
Subtotal	14	52	73	132	1	4	0	0	13	48	73	132	266
Feed & seed service													
1. Ag. feed mix spec.	1	2	1	2	0	0	0	0	1	2	1	2	6
2. Salesman feed & grain	0	5	10	14	0	0	0	0	0	5	10	14	29
3. Storage tech.	0	0	1	1	0	0	0	0	0	0	1	1	2
4. Nursery worker sprayer	18	10	14	20	0	0	0	0	18	10	14	20	62
5. Sprayer	13	20	18	31	2	1	0	0	11	19	18	31	79
Subtotal	32	37	44	68	2	1	0	0	30	36	44	68	178

Table 26. (Continued)

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
General agriculture													
1. Greens supt.	11	9	11	27	0	0	0	0	11	9	11	27	58
2. Tree surgeon	8	8	2	3	0	0	0	0	8	8	2	3	21
3. Tree pruner	2	1	1	1	0	0	0	0	2	1	1	1	5
4. Farm Supr./tech.	0	4	4	4	0	0	0	0	0	4	4	4	12
Subtotal	21	22	18	35	0	0	0	0	21	22	18	35	96
Not grouped													
1. Poultry tech.	12	15	21	29	3	1	0	0	9	14	21	29	73
2. Truck driver, heavy	11	36	38	69	3	0	0	0	8	36	38	69	151
3. Bookkeeper	1	1	1	1	0	0	0	0	1	1	1	1	4
Subtotal	24	52	60	99	6	1	0	0	18	51	60	99	228
Total	114	203	241	407	11	4	0	0	105	197	241	407	950

Table 27. Net manpower demand by occupational instructional programs and existing job titles by 1978, 1980, 1982 and 1985 in mechanical (automotive) and diesel occupations

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
Automotive mechanic													
1. Tuto mech.	13	93	125	212	11	49	56	0	2	44	69	212	327
2. Auto tune-up mech.	0	29	40	53	0	0	0	0	0	29	40	53	122
3. Front-end align.	2	13	24	25	0	0	0	0	2	13	24	25	64
4. Trans. mech.	0	30	41	59	0	0	0	0	0	30	41	59	128
5. Brademan, auto	11	57	91	68	0	0	0	0	11	57	91	68	227
6. Auto air-cond. mech.	2	16	24	39	0	0	0	0	2	16	24	39	81
7. Auto parts man	6	56	92	117	4	2	1	0	2	54	91	117	264
8. Tractor mech.	0	24	36	46	0	0	0	0	0	24	36	46	106
9. Constr. equip. mech.	18	63	69	137	6	12	8	0	12	51	57	137	259
Subtotal	52	381	540	754	21	63	65	0	31	318	475	754	1578
Automobile body repair													
1. Auto body repair	6	71	100	136	6	7	11	0	0	64	89	136	289
2. Auto spray ptr.	11	33	60	70	3	2	5	0	8	31	55	70	164
Subtotal	17	104	160	206	9	9	16	0	8	95	144	206	453
Automobile servicing													
1. Auto maintenance mech.	2	51	65	101	0	0	0	0	2	51	65	101	219
2. Auto service sta. attendance	4	15	20	17	0	0	0	0	4	15	20	17	56
3. Fuel injection service man	6	23	18	36	0	0	0	0	6	18	39	52	115
4. Tire repair man	6	20	39	52	0	2	0	0	6	18	39	52	115
Subtotal	18	109	142	206	0	2	0	0	18	107	142	206	473

Table 27. (Continued)

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				Total
	78	80	82	85	78	80	82	85	78	80	82	85	
Diesel & equipment maintenance													
1. Gasoline engine repair man (2- and 4-cycle)	4	18	23	28	0	0	0	0	4	18	23	28	73
2. Diesel mech.	30	162	169	278	0	15	9	00	30	147	160	278	615
3. Trans. mech. (diesel	14	12	13	23	0	0	0	0	14	12	13	23	62
4. Pipe fitter, diesel eng.	2	9	7	15	0	0	0	0	2	9	7	15	33
Subtotal	50	201	212	344	0	15	9	0	50	186	203	344	783
Not grouped													
1. Tractor-trailer truck driver	22	235	240	460	15	13	19	0	7	222	221	460	910
2. Light truck drv.	2	145	168	267	0	0	0	0	2	145	168	267	582
3. Bus driver[a]	10	77	90	172	0	0	0	0	10	77	90	172	349
Subtotal	34	457	498	899	15	13	19	0	19	444	479	899	1841
Total	171	1252	1552	2409	45	102	109	0	126	1150	1443	2409	5128

[a]Job title supplied by employers.

Table 28. Net manpower demand by occupational instructional programs and existing job titles by 1978, 1980, 1982 and 1985 in construction occupations

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
Heavy equipment or earth-moving machines operator (Bulldozer, dragline, & power shovel)	12	118	149	220	4	18	20	0	8	100	129	220	457
Carpentry													
1. Carpenter frm.	10	70	137	195	1	2	3	0	9	68	134	195	406
2. Carpenter	114	468	635	1091	14	20	28	0	100	448	607	1091	2246
3. Floor layer	30	68	132	148	0	3	7	0	30	65	125	148	368
4. Roofer	114	119	209	281	21	14	17	0	93	105	192	281	671
5. House reprmn.	5	16	46	40	2	2	0	0	3	14	46	40	103
6. Mainten. man	10	22	51	49	0	0	0	0	10	22	51	49	132
Subtotal	283	763	1210	1804	38	41	55	0	245	722	1155	1804	3926
Plumbing													
1. Plumber and pipe fitter	28	62	79	140	2	6	2	0	26	56	77	140	299
Brick-block-concrete training													
1. Bricklayer, mason	62	217	207	340	13	16	10	0	49	201	197	340	787
2. Concrete work, foreman	6	103	169	250	6	8	20	0	0	95	149	250	494
3. Concreting machines opr./drv.	60	208	204	375	16	14	24	0	44	194	180	375	793

Table 28. (Continued)

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
4. Plasterer (rendering)	4	173	211	316	0	0	0	0	4	173	211	316	704
Subtotal	132	701	791	1281	35	38	54	0	97	663	737	1281	2778
Not grouped													
1. Constr. worker	10	870	1128	1571	0	0	0	0	10	870	1128	1571	3579
2. Struct. steel worker	112	362	464	662	17	18	21	0	95	344	443	662	1544
Subtotal	122	1232	1592	2233	17	18	21	0	105	1214	1571	2233	5123
Total	577	2876	3821	5678	96	121	152	0	481	2755	3669	5678	12583

Table 29. Net manpower demand by occupational instructional programs and existing job titles by 1978, 1980, 1982 and 1985 in manufacturing and industrial occupations

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
Machinist, tool & die maker													
1. Machinist	77	109	90	188	11	12	13	0	66	97	77	188	428
2. Insp., floor	19	20	38	71	0	0	0	0	19	20	38	71	148
3. Insp. gage	6	23	21	40	0	1	3	0	6	22	18	40	86
4. Inst., general	22	40	32	76	0	4	3	0	22	36	29	76	163
5. Set-up man (job setter)	34	99	114	237	0	0	0	0	34	99	114	237	484
Subtotal	158	291	295	612	11	17	19	0	147	274	276	612	1309
Machine operator													
1. Eng. lathe set-up opr.	19	54	57	117	0	13	9	0	19	41	48	117	225
2. Turret lathe set-up opr.	29	69	64	123	7	18	17	0	22	51	47	123	243
3. Milling mach. set-up opr.	4	40	35	72	3	3	0	0	1	37	35	72	145
4. Grinding mach. opr opr.	10	20	25	45	4	6	3	0	6	14	22	45	87
5. Drill press opr.	5	10	16	38	4	4	1	0	1	6	15	38	60
6. Fourcault mach. prod. crew[a]	0	26	22	26	0	0	0	0	0	26	22	26	74
Subtotal	67	219	219	421	18	44	30	0	49	175	189	421	834

[a]Job title supplied by employer.

Table 29. (Continued)

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
Furnace operator[a]	5	10	9	10	0	0	0	0	5	10	9	10	34
Industrial mechanic													
1. Maint. mech.	61	159	176	299	4	16	7	0	57	143	169	299	668
2. Stationary engr.	4	18	20	40	0	0	0	0	4	18	20	40	82
Subtotal	65	177	196	339	4	16	7	0	61	161	189	339	750
Sheet metal													
1. Lay-out man	12	15	16	38	0	6	5	0	12	9	11	38	70
2. Pattern mkr, metal	23	44	40	80	15	7	0	0	8	37	40	80	165
3. Pattern mkr., metal, bench	0	12	12	19	0	5	0	0	0	7	12	19	38
4. Sheet metal wkr.	22	128	108	197	13	20	5	0	9	108	103	197	417
Subtotal	57	199	176	334	28	38	10	0	29	161	166	334	690
Welding													
1. Welder, gas	15	36	43	71	3	4	1	0	12	32	42	71	157
2. Welder, arc	16	106	162	230	15	19	25	0	1	87	137	230	455
3. Welder, comb.	22	36	53	79	7	5	9	0	15	30	44	79	168
4. Welder, heliarc	2	9	12	17	0	0	0	0	2	9	12	17	40
5. Welding mach. opr.	2	6	11	13	0	0	0	0	2	6	11	13	32
Subtotal	57	193	381	410	25	29	35	0	32	164	246	410	852
Mechanical technology													
1. Mech. eng. tech.	40	151	131	239	6	12	13	0	34	139	118	239	530
2. Instr. tech.	77	92	105	220	15	18	18	0	62	74	87	220	443
Subtotal	117	243	236	459	21	30	21	0	96	213	205	459	973

Table 29. (Continued)

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
Construction design & graphic drawing													
1. Draftsman, arch.	12	71	100	150	2	3	0	0	10	68	100	150	328
2. Draftsman, elec.	18	71	83	145	7	5	5	0	11	66	78	145	300
3. Draftsman, mech.	22	28	24	43	0	0	4	0	22	28	20	43	113
Subtotal	62	201	242	396	13	12	14	0	49	189	228	396	862
Finishing													
1. Finisher	0	20	19	36	0	0	0	0	0	20	19	36	75
2. Painter, spray	12	51	71	98	11	10	6	0	1	41	65	98	205
Subtotal	12	71	90	134	11	10	6	0	1	61	84	134	280
Not grouped													
1. Chem. lab. tech.	1	7	16	20	1	3	3	0	0	4	13	20	37
Total	601	1611	1760	3135	132	199	155	0	469	1412	1605	3135	6612

Table 30. Net manpower demand by occupational instructional programs and existing job titles by 1978, 1980, 1982 and 1985 in business and office including government occupations

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training needs by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
Secretarial Science													
1. Sec. & Steno.	56	45	72	64	0	0	0	0	56	45	72	64	237
General clerical													
1. General clerk, typist, rectp. tel. and dupl. mach. opr.	195	354	451	799	0	0	0	0	195	354	451	799	1799
General accounting (General bookkeeping & accounting)													
1. Shp. & rec. clerk, acct. clk., billing mach. opr., bkpr., calc. mach. opr., stat. clk, & compilers	4	41	41	80	0	0	0	0	4	41	41	80	166
Not grouped													
1. Libr. asst.	11	18	25	33	0	0	0	0	11	18	25	33	87
2. Purch. agent	2	16	19	33	0	0	0	0	2	16	19	33	70
3. Photographer	16	28	30	42	0	0	0	0	16	28	30	43	116
Subtotal	29	62	74	108	0	0	0	0	29	62	74	108	273
Total	284	502	638	1051	0	0	0	0	284	502	638	1051	2475

Table 31. Net manpower demand by occupational instructional programs and existing job titles by 1978, 1980, 1982 and 1985 in printing, publishing and allied occupations

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training need by 19--				
	78	80	82	85	78	80	82	85	78	80	82	85	Total
Photo offset printing													
1. Foreman, prt. shop	9	20	33	36	9	14	10	0	0	6	23	36	65
2. Offset pressman	7	14	20	26	1	0	0	0	6	14	20	26	66
3. Multilith opr.	5	13	20	26	0	1	0	0	5	12	20	26	63
4. Job printer	5	19	27	39	2	2	0	0	3	17	27	39	86
5. Photogr., litho	6	8	11	10	1	2	0	0	5	6	11	10	32
6. Folding mach. opr.	3	11	16	25	1	0	0	0	2	11	16	25	54
7. Commercial artist (illustrator)	3	6	9	11	0	0	0	0	3	6	9	11	29
Subtotal	38	91	136	173	14	19	10	0	24	72	126	173	395
Letter press printer													
1. Platen & letter press man	5	12	15	21	1	0	0	0	4	12	15	21	52
2. Linotype opr.	4	9	9	14	1	0	0	0	3	9	9	14	35
3. Compositor (typographer)	21	95	104	154	6	8	5	0	15	87	99	154	355
4. Linotype mach.	5	6	11	11	0	0	0	0	5	6	11	11	33
5. Bookbinder	11	26	31	37	4	6	0	0	7	20	31	27	95
Subtotal	46	148	170	237	12	14	5	0	34	134	165	237	570
Not grouped													
1. Cutter operator	12	9	10	15	3	2	0	0	9	7	10	15	41
Total	96	248	316	425	29	35	15	0	67	213	301	425	1006

Table 32. Net manpower demand by occupational instructional programs and existing job titles by 1978, 1980, 1982 and 1985 in service occupation

Proposed courses to train workers for the job titles listed below	Number needed to be trained by 19--				Number completing in-plant training by 19--				Unmet training need by 19--				Total
	78	80	82	85	70	80	82	85	78	80	82	85	
Conditioned air													
1. Refrig. mech.	5	7	6	9	1	2	0	0	4	5	6	9	24
2. Air conditioning mech. (com.)	2	9	12	18	1	0	0	0	1	9	12	18	40
3. Air conditioning mech. (dom.)	0	4	6	8	0	0	1	0	0	4	5	8	17
Subtotal	7	20	24	35	2	2	1	0	5	18	23	35	81
Electronic service													
1. TV & radio serv. & repairman	4	21	28	49	3	8	8	0	1	13	20	49	83
2. Elect. mech.	6	21	33	51	0	0	0	0	6	21	33	51	111
3. Elect. tech.	40	40	45	77	4	5	6	0	36	35	39	77	187
4. Instr. repmn.	0	7	7	12	0	0	0	0	0	7	7	12	26
Subtotal	50	89	113	189	7	13	14	0	43	76	99	189	407
General electrical													
1. Elec. motor rep.	12	25	30	62	3	2	1	0	9	23	29	62	123
2. Elec. appl. rep.	0	6	13	14	0	0	0	0	0	6	13	14	33
3. Electrician	94	325	559	609	30	46	69	0	64	279	490	609	1442
4. Line man	16	48	65	90	2	2	0	0	14	46	65	90	215
5. Turbine & boiler operator	4	20	33	48	1	3	4	0	3	17	29	48	97
6. Electro-mech. tech.	1	4	8	12	1	3	5	0	0	1	3	12	16
Subtotal	127	428	708	835	37	56	79	0	90	372	629	835	1926
Total	184	537	845	1059	46	71	94	0	138	466	751	1059	2414

manpower need through in-plant training programs. These tables present the number of workers needed to be trained in each job area (which was obtained from the preceding set of tables, 19 through 25) by 1978, 1980, 1982 and 1985, the number of workers completing in-plant training by 1978, 1980 and 1982, and the unmet training needs for each of these years. Data on in-plant training was not sought for 1985, since only manpower projections were made for that year.

To obtain the unmet training needs, the number of workers completing in-plant training in each of the four years listed was subtracted from the number needed to be trained.

Table 26 reveals that only 15 workers would have completed in-plant training by 1980 in the whole of agricultural and related occupations. On-the-job training programs were provided for three farm equipment mechanics, two farm equipment mechanic helpers, three sprayers, four poultry technicians, and three heavy truck drivers, leaving a total of 105 workers to be trained by 1978; 197 and 241 additional workers to be trained by 1980 and 1982, respectively.

Table 27 summarizes the number of persons completing in-plant training by 1978, 1980, 1982 and 1985 in mechanical (automotive) and diesel occupations. The data revealed a total of eight job titles in which in-plant training is being provided, distributed as follows according to the occupational instructional programs: automotive mechanic (3), automobile body repair (2), automobile servicing (1), diesel and equip-

ment maintenance (1), and tractor-trailer truck driver. Most of the in-plant training programs were in automobile mechanics where a total of 149 workers were expected to complete training by 1982, bringing the number of workers needed to be trained to 31, 318, and 475 by 1978, 1980 and 1982, respectively. The net training need in the entire occupational cluster was 126 workers by 1978, 1,150 workers by 1980, and 1,443 workers by 1982 and 2,409 workers by 1985.

Out of the 14 occupational titles listed under construction occupations, 11 or 78.57% had in-plant training programs. Table 28 reveals that a total of 96 persons will complete on-the-job training in all 11 occupational areas by 1978, 121 persons by 1980 and 152 persons by 1982, leaving a net training need for 481 persons by 1978, 2,755 persons by 1980, and 3,669 persons by 1982. The number of workers that need to be trained by 1985 remained the same. The pattern of the data revealed high probability that these in-plant training programs would continue to train workers after 1982.

Table 29 presents a summary of the number of persons completing in-plant training programs by 1978, 1980 and 1982 in manufacturing and industrial establishments in Bendel State. A total of 132 persons completed in-plant training by 1978. An additional 199 and 155 persons would complete in-plant training by 1980 and 1982, respectively, leaving a net total of 469, 1,412 and 1,605 skilled and technician workers to be trained by 1978, 1980 and 1982. The data further reveal a

decline in the number of persons completing in-plant training after 1980.

Another unique characteristic of business, office including government occupations is the complete absence of in-plant training as revealed by the data presented in Table 30. No such programs exist anywhere within the state.

It was previously found that most of the workers in printing and allied occupations were graduates of apprenticeship and in-plant training programs. Table 31 confirms that previous finding.

Most of the job titles which had five or more workers in 1978 had at least one person in an in-plant training program. The total number of workers who would complete in-plant training was 29 in 1978, 35 by 1980 and 15 by 1982. The same pattern observed in manufacturing and industrial occupational group was present in the printing occupational cluster. In-plant training would decline after 1980. Furthermore, Table 31 reveals the unmet training need to be 67, 213, and 301 workers by 1978, 1980 and 1982, respectively.

Table 32 presents the number of persons that would complete in-plant training by 1978, 1980 and 1982. The data show that out of the 13 job areas existing in the service occupational cluster, in-plant training programs were available in 9 areas, where a minimum of one to a maximum of 145 persons would be trained by 1982. The total number of persons completing in-plant training in all the 9 areas by 1982 would

be 211. Out of this number, 145 would be trained as electricians, leaving a total of only 66 persons in all the remaining 8 job titles. The service occupational cluster showed a likelihood of continued in-plant training after 1982. One hundred and thirty-eight workers would still need to be trained by 1978 before the skilled manpower needs can be met in this service occupational area. The number of additional workers needed to be trained by 1980 and 1982 were 466 and 751, respectively.

The Supply of Technical Labor in Bendel State

There were five vocational-technical schools, apart from the College of Technology, which cater to the technical manpower needs of the state at the time of the study. However, the author was told during the time that this study was conducted that the State Ministry of Education was considering the establishment of five additional technical institutes to train workers at the semi-skilled level.

The five vocational-technical schools train workers in six out of the seven occupational areas covered in this study. The manpower needs of the seventh occupational area are catered to by the school of agriculture. All six vocational-technical schools were included in the initial survey. However, only five schools (four vocational-technical and the school of agriculture) took part by responding to the questionnaire distributed to all six schools during the first

contact.

All the schools had a departmentalized curricular structure. Under this organizational structure, several courses were taught to all students in one department, which made it very difficult to determine the number of students who are concentrating their efforts to master the skills in a particular job area. It therefore became necessary to assume that all students in a particular occupational area (department) would fit into any of the job titles under that broad occupational group.

Table 33 contains a summary of the enrollment, in all five technical schools including the school of agriculture, organized according to the occupational instructional programs or departments. The table reveals three program areas in which enrollment figures were not available for 1982. These courses--fitter machinist, general welding, fabrication engineering, and carpentry and joinery--have a shorter duration (3 years) than auto-mechanics, building construction, and electrical construction which are of four years duration. The only five-year program is business and office education. However, the school of agriculture offered a two-year general agricultural training course to qualified students.

Out of the 899 students who entered the labor force in 1978, 227 entered business and office occupations, 219 were supposed to have found employment in mechanical (automotive) and diesel occupations, 215 in service occupations, 138 in

Table 33. Manpower supply by occupational instructional programs by the public vocational schools

Occupational instructional programs	Number of students graduating by 19--				Total
	78	80	82	85	
Auto-mechanis	219	515	328	-[a]	1062
Filter machinist	26	59	-	-	85
General welding	23	40	-	-	63
Fabrication engineering	14	41	-	-	55
Building construction	123	278	214	-	615
Carpentry & joinery	15	53	-	-	68
Electrical construction, wiring & applicance repair	215	491	274	-	980
General agriculture	37	209	400[b]	-	646
Business & office education	227	461	514	-	1202

[a]Figures not yet available.

[b]Estimated enrollment by the school of agriculture which presently is running a two-year intensive basic agricultural program.

construction occupations, 37 in agricultural and related occupations and the remaining 63 in manufacturing, industrial and related occupations.

The table also reveals that by 1982, a total of 1,202, 1,062 students would have completed their training in business and office education, and auto-mechanics, respectively, while only 980 and 646 students would have been trained in service

and agricultural occupations. The number of students who would graduate by 1982 from building construction, and carpentry programs was 683. Fewer than 100 students were expected to complete their training in each of the remaining programs, that are of three years duration, by 1980.

Table 34 summarizes the results of the comparative analysis made to determine if any significant difference existed between the supply of and demand for skilled and technician workers in Bendel State by 1982. The table reveals only one occupational area (general agriculture) in which the supply of trained workers would exceed the demand by 1982. Apart from business and office education where the demand for trained workers exceeded the supply by 57 workers, the difference between demand and supply figures exceed 200 in four occupational instructional areas, and 1000 in three program areas which included fitter machinist, building construction, and carpentry.

The result of the X^2 revealed that a significant difference existed at $\alpha = .001$ level between the supply of and demand for trained skilled and technician workers in 8 out of the 9 occupational instructional program areas in Bendel State.

There would be overproduction of trained workers in general agriculture and underproduction of skilled and technician workers in building construction, carpentry, manufacturing and industrial, mechanical (automotive) and

Table 34. The result of the chi square (X^2) test of significant difference between manpower supply and demand by occupational instructional programs by 1982 in Bendel State

Existing occupational instructional programs	Manpower[a] S	Manpower[a] D	S-D (+/-)	X^2 result	α level
Auto-mechanics	1062	1263	-201	31.83	***
Fitter machinist	85	1110	-1025	945.59	***
General welding	63	442	-379	324.12	***
Fabrication engineering	55	356	-301	253.65	***
Building construction	615	2412	-1797	1338.06	***
Carpentry & joinery	68	1366	-1298	1232.44	***
Electrical construction, wiring & applicance repair	980	1355	-375	103.51	***
General agriculture	646	362	284	222.02	***
Business & office education	1202	1259	-57	2.54	

[a]S = supply, D = demand, S-D = supply less demand.

***Significant at .001 level (highly significant).

diesel, and service occupations. Moreover, Table 34 reveals a balance between demand and supply of trained workers in business and office occupations.

Table 35 shows seven program areas which should be expanded to meet the need for trained technical manpower, in

Table 35. Programs requiring expansion, reduction, or retrenchment on the basis of manpower need in Bendel State

Programs	Adequate	Require expansion	Require reduced enrollment	Needed to be retrenched or phased out
Auto-mechanis		1		
Fitter machinist		1		
General welding		1		
Fabrication engineering		1		
Building construction		1		
Carpentry & joinery		1		
Electrical construction		1		
General agriculture			1	
Business and office education	1			
Total	1	7	1	0

those occupational areas catered to by these programs.

Only one occupational preparatory program (business and office education) was revealed to be adequate on he basis of the number of students who are preparing for the available positions in business and office occupations. General agriculture was the only program area requiring reduced enrollment.

Table 36 contains a priority list of recommended new

Table 36. Recommended new training programs[a] in order of priority

Rank order	Programs	Total training need by 1985
1	Driving (all vehicles including tractor	5,128
2	Structural steel construction	1,544
3	Mechanical engineering and instrumentation technician	973
4	Printing	965
5	Design (construction design and graphic drawing including estimating)	862
6	Industrial mechanic	750

[a]Criteria for recommending new programs: A net manpower need for 90 or more workers each year for at least 5 years (i.e., 720 workers by 1985).

training programs on the basis of the established needs for trained skilled and technician workers in related occupational titles. It was specified in Chapter III, under criteria for recommending new training programs, that a need must be established for 90 workers to be trained each year for at least five years.

On the basis of the preceding criteria six new training programs were recommended. These included: driving, structural steel construction, mechanical engineering and instrumentation technician, printing, design and industrial mechanic in that ranked order.

CHAPTER V. DISCUSSION OF FINDINGS

The problem of the study was to determine the current number of workers within the Bendel State workforce, both skilled workers and technicians, and the number that would be employed in each of the seven occupational areas by 1980 and 1982. On the basis of the manpower trend in each of the job titles in the occupational clusters surveyed, projections were made to determine the number of workers that would be needed, by job titles, in 1985. The data would yield results that would provide justification for decisions concerning occupational oriented programs in the public vocational and technical schools in the state of Bendel.

The survey was limited to employers who had ten or more regular employees on their payroll and whose establishments were registered in the state government registry of establishments. Occupational clusters included in the survey were agricultural and related occupations, mechanical (automotive) and diesel occupations, construction occupations, manufacturing and industrial occupations, business and office including government occupations, printing, publishing and allied occupations, and service occupations.

All 253 employers who satisfied specified requirements for inclusion in this study were personally contacted, and 143 responded to the survey instrument. The findings of this study therefore represented the data provided by 143 or 56.52%

of 253 employers of skilled and technician workers in seven occupational clusters in Bendel State.

From the analysis of data collected on the sources of labor in the level of skilled and technician workers, it was found that most of the workers in the categories of skilled and technicians engated in agricultural activities in Bendel State were trained in public vocational agricultural schools. This finding was based on the 67.72% of all 381 employees who received their pre-employment training in vocational agricultural schools. Few workers in the agricultural occupational cluster received their preservice training in apprenticeship and in-plant training programs. Although the majority of the workers were trained in agricultural schools, the level of diversification is still very low. A total of 11 job areas included in the instrument were found not to be in existence. This might be explained by the comparatively low level of agricultural advancement in the state. Only government-owned farms were mechanized. Most of the other private farmers still farm at the subsistence level. Nevertheless, farming in the state is becoming increasingly mechanized because of the government determination and effort in providing farmers with all the necessary equipment and technical labor they require to engage in mechanized farming. With "Operation Feed the Nation" scheme, farmers could obtain loans of "any amount" at minimum interest for purposes of farming.

The implication of the current trend is not difficult to

determine. As farmers are helped to practice agriculture on a large scale, they will soon concentrate their efforts in raising fewer crops which will gradually lead to specialization. As farmers begin to specialize in raising particular kinds of crops, agriculture will become so diversified that there will be need for workers in most of the present job areas which are not available. Consequently, training programs will begin to take on increased specialization, and most of the workers who were trained in general agriculture will require retraining. Moreover, increased mechanization would necessitate, simultaneously, a reduction in the number of workers employed in agricultural occupations. A similar trend was revealed by the findings of four studies conducted in Iowa by the Cooperative Extension Service of Iowa State University between 1965 and 1970.

The findings revealed that positions demanding great responsibilities were filled by graduates of vocational-technical agricultural schools. This served as a great encouragement to both teachers and students of the agricultural training schools, since it revealed the willingness of employers in agricultural occupations to accept for employment graduates of the agricultural schools.

Contrary to the findings in agricultural and related occupations, most of the employees in mechanical (automobile) and diesel occupations were graduates of apprenticeship training programs. Out of the 1,950 employees in 1978 in mechani-

cal (automobile) and diesel occupations, 1,282 or 65.74% were graduates of various apprenticeship programs. In contrast, only 327 or 16.77% had their preservice preparatory training in public vocational-technical schools. The author interviewed some of the employers on the reasons why they employ relatively few numbers of graduates of the public vocational-technical schools. The most commonly given reason was the lack of skill by graduates of the public schools and the unwillingness observed in graduates of these schools to accept their limitations and be prepared to acquire the required competencies on the job. However, most employers testified that graduates of public vocational-technical schools acquire the job skills faster than employees recruited from other programs. Nevertheless, they still prefer hiring graduates of apprenticeship programs.

The study also revealed the mechanical and diesel occupational cluster to be one of the areas where employers were determined to provide their own training programs. The pattern of the data concerning in-plant training showed that in-house training programs are increasing and will probably continue to exist after 1982.

Out of the 5,628 workers employed in all areas of construction occupations, 2,541 or 45.15% were trained in public vocational-technical schools, 2,067 or 36.73% were graduates of apprenticeship programs and only 825 or 14.16% were trained on the job. It was remarkable to find that the overall dis-

tribution pattern of workers in construction according to programs (or places) of training was the same in most of the existing job titles, except structural steel worker, estimator, heavy equipment operator/driver and a couple of others, including carpenter in which the number of workers who graduated from other training programs exceeded the number of workers who were trained in public vocational and technical programs.

Although construction had the greatest proportion of public school graduates, it was revealed as one of the occupational areas where the probability of continued on-the-job training will remain high. The pattern of the data gathered concerning in-plant training tends to indicate that on-the-job training would continue in the construction occupational area after 1982. Moreover, in-plant training programs are available in 11 out of the 14 job titles listed under construction cluster.

Another occupational group in which most of the employees in the skilled worker and technician category were graduates of public vocational-technical schools was manufacturing and industrial. It was found that out of the 2,937 persons working in the categories of skilled and technician occupations in manufacturing and industrial area, 1,238 or 42.5% were trained in public vocational-technical schools. In-plant training program graduates ranked next, consituting 30.1%. Unless the in-plant training programs start to decline, the demand for

graduates of public vocational-technical schools in the manufacturing and industrial cluster may not need to be expanded too drastically. However, it seemed that in-plant training will start to decline after 1980 as revealed by the combined enrollment in all in-plant training programs in the industrial and manufacturing establishments. The total enrollment of workers completing in-plant training programs was found to be 132 in 1978, 199 by 1980 and 155 by 1982.

All the workers in business and office occupations had their pre-employment training in public vocational schools. Employers in the business and office occupational cluster rely totally on the public vocational schools to supply them with all the intermediate manpower they needed. Hence, there are no in-plant training programs in the business and office occupations.

Since none of the public vocational and technical schools in Bendel State offered training programs in printing, publishing and allied occupations, it was expected that most of the employees in the printing industry would not receive their pre-employment training in public vocational schools. The findings revealed that approximately 94.6% of the skilled and technician workers in printing and publishing occupations were trained on the job either by their current or previous employers. This finding was further supported by the result of the finding relative to in-plant training, where the total number of workers who would complete in-plant training by 1982 was

found to be 79. Although in-plant training was provided in most of the job areas, the pattern revealed by the number of workers who are expected to complete these programs by 1978, 1980, and 1982 seems to indicate that these programs would be reduced considerably by 1980.

In contrast, within the service cluster there was enough evidence to conclude that in-plant training programs would continue to exist after 1982 and continue to be one of the major sources of preparing skilled and technician workers in service occupations. In-plant training programs were found to be available in 9 out of the existing 13 job titles listed under service occupations. Presently, most of the workers in this occupational cluster received their training in public vocational and technical schools, although the proportion of workers trained in apprenticeship programs, which was found to be 29.68%, was also considered to be fairly high.

Generally, the findings showed a comparatively small proportion of expatriate employees in the two categories of skilled and technician workers in most of the occupational groups. Occupational clusters having the highest proportion of expatriate workers included agricultural occupations, manufacturing and industrial occupations, and construction occupations where the proportion of expatriates to the total number of employees was found to be 9.45%, 7.93% and 3.45%, respectively. These occupations were followed in rank order by service, and automotive and diesel occupations where ex-

patriate workers made up 3.12% and 1.59% of the total employment in these occupations.

The findings further revealed a prevailing shortage of trained skilled and technician workers in Bendel State in six out of the seven occupational areas included in this study. Mechanical (automobile) and diesel occupations was the only occupational cluster in which employers commonly checked the supply of trained workers as either adequate or surplus. Most of the job titles checked by over 50% of the employers as areas having adequate supply of trained workers were checked by other employers as having an oversupply of trained workers. Nevertheless, the anticipated need revealed a continued demand for workers in most of the job titles listed under mechanical and diesel occupations. This, however, does not suggest a need to expand the existing training programs in the public vocational and technical schools since most of the employers preferred hiring graduates from other programs to fill vacancies left by the graduates of their own in-plant training programs. The attitudes of employers need to be improved to predispose them to employ more graduates of public vocational automobile programs.

When some employers were interviewed further and asked to suggest measures that could bring about a change of attitude, most suggested the inclusion of a requirement in the public occupational preparatory program of industrial experience or internship which every student must complete

after the first one or two years in the technical schools. Moreover, they recommended that such practical on-the-job training, which should be supervised and evaluated by the employer or his appointed representative, should constitute approximately one-third of the total training period.

The shortage of trained skilled and technician workers in agricultural and kindred occupations in Bendel State was due to the nonexistence, until recently, of an agricultural training school in the state, and attitudes of the general public toward employment and training in agricultural occupations. Agriculture has been one of the few occupations that were not viewed very positively by the Nigerian parents and youths. On the other hand, the shortage of skilled and technician workers in the remaining occupational clusters could be attributed to the lack of adequate investment of funds in public occupational preparatory programs by the government and the nonavailability of detailed, accurate and specific statistics on the manpower needs in the occupational areas for which the public schools were supposed to be training future workers. Such statistics ought to be collected regularly and made available to the planners of the technical and vocational schools training programs.

Upon a critical examination of the employment trend in most of the job titles and in each occupational cluster, the researcher decided to determine the mean annual growth rate in each of the seven occupational areas. He found that most

of the occupations had a very high growth rate comparing the employment in 1974 and the employment by 1978. A similar result was obtained when the 1978 employment figures were compared with the anticipated employment by 1982 and the 1985 projected employment. For example, the mean annual growth rate in agricultural and related occupations was calculated to be 32.04%. Employment in construction occupation increased at an average rate of 26.44% per year. The mean annual growth rate in manufacturing and industrial, and service occupations were 28.32% and 29.07%, respectively. The lowest mean annual growth rate was found in printing, publishing and allied occupations to be 11.63%. The average growth rate showed that for every ten persons employed in 1974, two additional workers were expected to be employed each year. However, this was not the case, probably due to the lack of adequate supply of trained workers.

On the whole, two trends were revealed in the growth pattern relative to the employment of skilled and technician workers in Bendel State. The first trend which showed a gradual but uniform rate of growth occurred during the first five-year period between 1974 and 1978. The growth rate between 1978 and 1985 is expected to be rapid and very uneven. Differences in the two growth patterns might be attributed to the vacancies which must have persisted throughout the entire first five-year period as a result of the non-availability of trained workers, but which employers hoped to

fill and maintain, anticipating a greater output of trained workers within the next five years.

With the limited supply of trained workers in the state of Bendel, it was not surprising to find a very high turnover of labor (replacement factor) in almost all the job areas in the seven occupations included in the study. There is great mobility of labor which had some detrimental impact on many establishments in Bendel State. This can be attributed to the limited output of trained skilled and technician workers, and the great and increasing demand in most occupations for these categories of employees. Consequently, there existed an unhealthy competition among employers for these workers, which explained the reason for the high rate of movement among skilled and technician workers in Bendel State, from one establishment to another.

Therefore, when employers were requested to estimate on the basis of their past experiences, the average percent of workers per year who leave their employment due to retirement, death, resignation or promotion, the rates ranged between 7.4% and 33% in agricultural and related occupations; between 10% and 25% in mechanical (automobile) and diesel occupations; between 7.66% and 18.5% in construction; 5% to 30% in manufacturing and industrial; 10% to 25% in printing and publishing; 6.98% to 11.48% in business and office, and 10% to 25% in service occupations. The lowest replacement factor was in business and office occupations where the factor ranged from

6.9% to 11.48%. The movement of skilled workers in business and office occupations is comparatively low, which confirmed the finding that the supply of workers was adequate in this occupational cluster.

Moreover, the data revealed that job titles with small number of workers had the highest rate of labor turnover. Probably the demand for these workers is high also, or the high rate of turnover is dependent upon the original small number of workers employed. The probability of obtaining a high rate of turnover where the initial employment is small is very high.

The range of employee turnover rate for manufacturing and industrial occupations was comparatively wide. This means that the turnover rate within the occupational cluster varied widely from one job title to another.

Furthermore, the findings revealed the wide or common use of in-plant training programs to prepare workers on the job. A further detailed examination of the data yielded an explanation of the reason, which was a lack of adequate supply of skilled and technician workers. This is why many employers resorted to training their own workers even though such training was very expensive considering the investment in time, material, and equipment. Unfortunately for most of these employers, these workers leave them for other establishments after completing their training.

The total anticipated additional employment including

current vacancies and expatriate employees, as revealed by the findings of this study, would be 8,227 by 1980. Comparing this figure of 8,227 additional employees, which was obtained for only one of the least populated out of the 19 states in the Federation, against the total estimated employment for the whole nation in the 3rd National Development Plan, of 210,450 workers, one might suspect that this study yielded figures far above what the actual projected employment will be.

However, findings of this study were based on the data obtained directly from employers. On the other hand, the estimates in the 3rd National Development Plan were not based on employers' estimates but on past employment trends which failed to take into account unfilled vacancies. Secondly, labor turnover (i.e., replacement factor) might have been arbitrarily estimated.

If the total estimated employment for a country whose population was about "80 million" in 1973 is 1,500,000 in 1975, and 1,980,000 by 1980, as stated in Table 37, what would happen to the rest of the 78 or more million people. Even if the above national employment figures were estimated for the public sector only, which was not specified, the accuracy of these low estimates will still create obvious doubts in the minds of its readers. The author has not in any way tried to justify the results of his study by the preceding discussion.

Writing from the 3rd National Development Plan, Osuala (61, p. 236, 237) presented the following section dealing with

Table 37. Employment targets in large and medium-sized establishments, 1975-1980[a]

Occupational group	Estimated employment 1975	Estimated employment 1980	Additional employment 1975-80
Senior category	91,500	126,750	35,250
Intermediate category	252,000	339,300	87,300
Skilled and semi-skilled category	436,500	559,650	123,150
Unskilled	720,000	954,300	234,300
Total	1,500,000	1,980,000	480,000

[a]Source: Third National Development Plan, (58, p. 376).

the ways and means through which the Federal Government hopes to tackle the unemployment and manpower problems confronting the nation:

> During the Plan period, the federal government plans to expand the Yaba Trade Center at a cost of ₦ 1.5 (U.S. $2.44) million so that the institution can admit more students. The Federal government will spend a total of nearly ₦ 48 (U.S. $78.24) million in direct investments in technical education, ₦ 12.5 (U.S. $20.37) million of which will be devoted to the expansion of the Yaba College of Technology so as to increase student enrollment from the current number of 1,500 to 5,000. The balance of ₦ 35 (U.S. $57.05) million will be spent in establishing three new colleges of technology at sites yet to be determined.
>
> The state governments together plan a total investment of ₦ 87.131 (U.S. $142.02) million directed toward expanding secondary technical schools, artisan schools, domestic science and handicraft centers as well as the establishment of new ones. It is hoped that a total of

ninety-one technical institutions are expected to generate a target enrollment of 117,686 by 1980 as shown in Table 38.

The study revealed that 4,776 workers would complete their training by 1982 in all five public vocational-technical schools including the school of agriculture. Excluding the 646 students who are expected to graduate from the agricultural schools, the total output of intermediate workers by 1972 would be 4,130.

The target enrollment set for Bendel State (former Mid-Western State) in the 3rd National Development Plan was for 19,500 new students. If the former enrollment proportion is maintained, the estimated number of students who should be receiving occupational preparatory training by 1980 in Bendel State would be 25,454. From all indications, coupled with the action of the State Ministry of Education to reduce the former 12 public vocational and technical schools to 5, there seemed not to be any evidence nor reason to believe that the planned target can be attained (see Table 38).

Although the findings indicated the existence of a significant need to expand all the technical programs (i.e., excluding business and office education) the author did not consider any expansion to be necessary in the area of auto-mechanics where the additional need for 201 trained workers was found to be significant at $\alpha = .001$ level. Though not specifically stated and included in original design of the study, the author interviewed some of the employers in most

Table 38. Enrollment targets in secondary technical and vocational schools

Governments	1960		1964		Recent trends
	No. of schools	Enrollment	No. of schools	Enrollment	No. of schools
Benue-Plateau					4
Kano					2
Kwara					3
North-Central	14	2,102	16	2,703	-
North-Eastern					4
North-Western					2
East-Central	9	876	10	1,739	19
South-Eastern					6
Rivers					3
Lagos	2	1,955	3	2,445	2
Mid-Western[a]	4	194	4	-	14
Western			5	815	10
Grand total	29	5,037	39	7,702	69

[a]Bendel State (former Mid-Western State).

			Targets		
1971	1974		1975-1980		
Enrollment	No. of schools	Enrollment	No. of new schools	No. of new classrooms	Enrollment
616	6	748	8	186	8,220
594	3	1,145	7	104	3,626
744	3	605	9	200	12,000
-	4	1,276	4	226	12,250
664	6	911	5	113	5,414
387	3	528	28	2,099	41,982
3,996	11	4,738	11	90	3,800
447	10	1,900	12	547	13,119
849	9	1,284	2	20	2,178
872	4	1,378	6	264	19,500
4,558	12	5,954	2	178	3,541
1,863	13	2,450	-	16	1,056
15,590	84	22,588	94	4,079	117,686

of the seven occupational areas, and found a general reluctance among employers of auto-mechanic workers to hire graduates of the public vocational and technical schools.

When the researcher decided to test interdependence between the public vocational-technical schools' preparatory programs and the manpower needs in Bendel State, the sample results deviated highly from what would be expected if training programs dependent on manpower needs. The fact that training programs are not sufficiently responsive to the state manpower needs is a direct indication of the noninvolvement of industry, business and other establishments in planning, implementing and maintaining the public occupational preparatory program in Bendel State.

CHAPTER VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

As stated earlier, one of the major educational concerns of the present Nigerian government is the desire to achieve a balance in the nation's education system. This concern must have stemmed from the nation's desire to industrialize, and a thorough understanding of the economic factors which are prerequisites to the attainment of the industrialization objective. Consequently, the present decade has witnessed a rapid growth of businesses and industries which have already created a very high demand for vocationally and technically trained manpower.

There is, therefore, a need for relevant manpower information to be sought, obtained and made available to the Ministry of Education on which to base decisions concerning expansion (if necessary), modification and improvement of its educational programs. Consequently, the problem which prompted and necessitated this study was to determine the current number of vocationally and technically trained workers and the number that would be needed in Bendel State by 1980 and 1982. The study focused on the demand for trained manpower in both public and private sectors in the seven occupational areas of: (1) agriculture, (2) mechanical (automobile), (3) construction, (4) manufacturing and industrial, (5) business and office, (6) printing, publishing and allied, and (7) service,

by job titles; and how: (1) public vocational-technical schools and (2) in-plant training programs are responding to the manpower needs.

Summary and Conclusions

Information concerning manpower sources, current and future manpower needs (as revealed in the current vacancies and utilization of expatriate employees, and the anticipated employment by 1980 and 1982); and the current position of trained manpower in Bendel State were obtained from the data supplied by public and private employers of technically trained persons in the Bendel State. To be able to predict the manpower needs after 1982, employers were asked to indicate the number of workers they had each year since 1974 and their anticipated employment by 1980 and 1982.

On the other hand, data relating to training (supply) of skilled and technician workers were obtained from the public vocational and technical schools in the state.

Specifically, two major factors were included in this study: (1) the number and kind of technical manpower that will be needed in Bendel State by 1980, 1982 and 1985, including the current need; and (2) the implications for vocational-technical education in Bendel State.

Tables 19 through 25 presented a summary of the anticipated employment growth and the total requirement/need for trained skilled and technician workers by 1978, 1980, 1982,

and 1985 in each of the existing job titles by occupational group in Bendel State.

The objective of the study (stated here in question form) together with the results obtained on the basis of the findings and the resultant conclusions were as follows:

1st objective/question: What is the current need for trained workers in each occupational category by job title?

Related findings: According to the data presented in Tables 19 through 25, the number of vacancies requiring skilled and technician workers, the number of skilled and technician workers employed, and the proportion of vacancies to employment in 1978 was found as follows:

Occupations	No. of vacancies	No. employed	Proportion of vacancies to employment
Ag. & related	284	381	.299
Mech. (auto) & diesel	171	1,950	.088
Construction	577	5,378	.107
Mfg. & industrial	601	3,187	.189
Printing, publishing & allied	96	315	.305
Business & office, including gov.	284	1,395	.204
Service	184	1,860	.099

Conclusions: There is a varying proportion of job vacancies to employment which exceeded .1 or 10% in five of the seven clusters surveyed. This proportion was considered to be high and should be reduced as soon as possible to increase production of goods and services in these occupations. However, the proportion of job vacancies to the surveyed employ-

ment was relatively low, and within justifiable limits, in mechanical (automobile) and diesel, and service occupations.

Generally, there existed a sufficient need for additional technically trained workers in Bendel State to justify the expansion of technical training programs.

2nd objective/question: What is the anticipated employment growth in the various occupations?

Related findings: The data relating to current and anticipated employment were also presented in Tables 19 through 25 for all the occupational groups studied. By 1985, the number of persons expected to be employed in the categories of skilled and technician workers in the following occupational clusters are projected as follows: agricultural and related occupations, 756; mechanical (auto) and diesel, 3,950; construction 11,009; manufacturing and industrial 5,894; printing, publishing and allied 715; business and office 2,378; and service 3,592. The 1978 employment including vacancies was found to be 459; 2,909; 5,783; 3,524; 411; 1,679; and 1,986 skilled and technician workers in the seven occupational clusters as listed above.

The anticipated employment growth, therefore, would be 42 workers per year (w/y) in agriculture, 266 w/y in mechanical (automobile), 747 w/y in construction, 339 w/y in manufacturing and industrial, 43 w/y in printing, 100 w/y in business and office, and 299 w/y in service occupations.

Conclusion: It is estimated that there will be a considerable need for trained skilled and technician workers between 1978 and 1985 in the categories of construction, manufacturing and industrial, mechanical (automobile) and diesel, and service occupations where the anticipated employment growth will be over 200 workers per year. The expected employment growth in business and office, printing, publishing and kindred occupations, and agricultural and related occupations will remain comparatively small.

3rd objective/question: How many workers would complete in-plant training by 1980 and 1982 in each occupational area?

Related findings: The data related to in-plant training programs were presented in Tables 26 through 32. These tables revealed that 15 workers would complete in-plant training by 1982 in agricultural occupations. A total of 256 workers would complete in-plant training by 1982 in automobile mechanic and seven other job areas in automobile and diesel occupations. Eleven out of 14 occupational titles in construction occupation had in-plant training programs in which 369 workers would be trained by 1982. In manufacturing, 486 workers were expected to complete in-plant training by 1982. The number of workers who are expected to complete in-plant training by 1982 in printing and service occupations was 79 and 211, respectively.

Conclusion: The number of workers who are expected to complete in-plant training by 1982 is less than 10% of the

net training need by the same year in four of the seven clusters surveyed. However, in-plant training programs appeared to be prevalent probably because the public training programs are not responding adequately to employers' needs for trained manpower.

4th objective/question: What is the turnover rate of labor in each occupational group by job title:

Related findings: Data related to the average turnover rate of workers as estimated by employers were presented in Tables 19 through 25. Most of the job titles which had 5 or more workers had a turnover rate between 5% and 33% (see Tables 19 through 25 for details).

Conclusion: There was considerable mobility among skilled and technician workers in Bendel State from one establishment to another as indicated by a mean annual rate of 20%. This implies that skilled and technician workers are in great demand in most clusters. Moreover, it indicates a short supply of trained workers in relation to the occupational opportunities.

5th objective/question: What would be the need for trained skilled and technician workers by 1980 and 1982 by selected occupational group?

Related findings: Findings related to the net training need are presented in Tables 26 through 32. The number of vacancies still needed to be filled by trained skilled and technician workers after the graduates of in-plant programs have been placed was found as follows:

Occupations	Unmet training need by: 1980	1982	Total by 1982
Agric. & kindred	197	241	438
Mech. (auto) & diesel	1,150	1,443	2,593
Construction	2,755	3,669	6,424
Mfg. & industrial	1,412	1,605	3,017
Printing & publishing	213	301	514
Business & office	502	638	1,140
Service	466	751	1,217
Total	6,695	8,648	15,343

Conclusion: Since apprenticeship and in-plant training programs are greatly deficient in supplying the technical manpower needed in Bendel State, the public vocational and technical schools have the responsibility for training the additional number and kind of intermediate manpower needed in the state. There was sufficient need for skilled and technician workers in six of the seven clusters to justify the accelerated expansion of technical training programs except in business and office.

6th objective/question: Is the supply of skilled and technician workers in Bendel State short, adequate, or surplus?

Related findings: Mechanical (automobile) and diesel occupations was the only occupational cluster in which there was an adequate supply of workers in most job areas. Most of the job areas in all the other occupational clusters were indicated by employers to be in need of additional trained workers.

Conclusion: There is a prevailing shortage of trained skilled and technician workers in Bendel State in six of the seven clusters investigated.

7th objective/question: To what extent are the public vocational-technical training programs responsive to the state's manpower needs?

Related findings: Data relating to the supply of trained skilled and technician workers between 1978 and 1982 from the five public vocational and technical schools which participated in the study are presented in Table 33. When compared with the unmet or net training needs by 1982, the result of the chi square test indicated that there is a significant difference between the supply of, and the demand for trained workers in 9 out of 10 existing instructional areas (see Table 34 for details).

Conclusion: Apart from business and office education, the remaining public vocational and technical training programs in Bendel State are not sufficiently responsive to the state's manpower needs at the time of the study. There was enough evidence to support the need for expansion of the existing training programs based upon the results of this study.

No training program(s) existed for training workers for the printing, publishing and allied occupations. Based upon the planned number of student in-take, 200 per year, for agricultural and related occupations, into the school of agriculture by 1980, conceivably there could be overproduction

of graduates in this cluster.

Furthermore, the findings established a need for developing new training programs, on the basis of the identified need for additional skilled and technician workers in seven instructional areas which included vehicle drivers, structural steel construction workers, mechanical engineering and instrumentation technician, printing, design, and industrial mechanic in this priority order.

8th objective/question: What would be the need for skilled and technician workers by 1985 in each of the seven occupational areas?

Related findings: The projected number of workers who will be employed in each job area by occupational groups was obtained through the GLM statistical method. After deducting the anticipated number of workers that will be employed by 1982, Tables 19 through 25 revealed the need for trained skilled and technician workers by 1985 to be 407; 2,409; 5,678; 3,135; 425; 1,051; and 1,059 in agricultural, mechanical and diesel, construction, manufacturing and industrial, printing and publishing, and service occupations, respectively.

Conclusion: There will be continued need, to a varying degree, for trained skilled and technician workers in Bendel State by 1985, in all the occupational clusters included in this study. Training programs should be more responsive to projected manpower needs.

Recommendations

In reference to the findings of this study and the resulting conclusions, the following recommendations were offered:

1. To close the gap between employment and vacancies some of the public training programs should be expanded. These included carpentry, building construction, fabrication engineering, fitter machinist, welding, and electrical construction.

2. Evening classes, for out-of-school youths who are in need of saleable job oriented skills and employed men and women seeking to upgrade their skills, should be planned and made available to interested persons in the form of extramural training or continued education by public vocational and technical schools in order to catch up with the ever increasing demand for trained workers while reducing the growing army of the unemployed.

3. New training programs should be established to train skilled and technician workers in the following instructional areas: driving, structural steel construction, mechanical engineering and instrumentation technician, printing, design, and industrial machinist.

4. The following programs should be evaluated very critically before any expansion is considered: auto-mechanic and business and office education, while the contemplated

increase in the intake of students into the school of agriculture might not be of any economic benefit to the state. (The literature revealed that as farming takes on increased mechanization resulting in larger farms, the number of farms and agricultural employment declines.) There is a high probability that such trend will occur in Bendel State within the next ten years.

5. To determine how enrollment in the public vocational and technical occupational preparatory programs have responded to the manpower needs by 1985, further investigation will be required by 1981.

6. A follow-up study of program graduates should be conducted every five years, on a regular basis, to determine and evaluate program effectiveness, particularly in the aspect of job placement.

7. A research survey should be conducted to ascertain potential students' interests in the recommended new vocational and technical education programs as a necessary prerequisite for the establishment of these programs.

8. Industry and business should play an advisory role in planning, maintaining and evaluating public occupational preparatory programs.

9. A task analysis of occupations, in which there is a significant need for manpower, should be performed prior to developing appropriate training curricula.

10. The study also established a need to assess employers' attitude and willingness to hire graduates of public vocational and technical schools. There is therefore a need for further research to determine employers' opinions concerning the comparative costs and benefits of preparing their workers in-house, versus leaving this responsibility totally to the public vocational and technical schools while they play a supportive role through providing and supervising the practical aspect of the training.

BIBLIOGRAPHY

1. Abernethy, David B. The Political Dilemma of Popular Education: An African Case. Stanford, California: Stanford University Press, 1969.

2. Agency for International Development. The Forecasting of Manpower Requirements. Washington, D.C.: Department of State, Agency for International Development, February, 1963.

3. American Vocational Journal. "Apprenticeship in the New World". American Vocational Journal, 1976, 51, No. 5, 25.

4. Anderson, Noris D. "Determination of the Needs for Additional Post-High School Occupational Training Programs in the San Luis Valley of Southern Colorado. (Doctoral Dissertation, Brigham Young University 1965). Dissertation Abstracts, 1966, 25, No. 7, 3710.

5. Applegarth, Boyd L. "A Study of the Relationship Between Vocational Education in Columbia County, Oregon, and Employment Opportunities in Columbia County and the Portland Metropolitan Area." Doctoral Dissertation, University of California, Berkeley, 1966.

6. Arnold, Walter M. "Area Vocational Education Programs." School Life, January 1960, 42, No. 6, 16-21.

7. Barr, Anthony J., James H. Goodnight, John P. Sall & Jane T. Helwig. SAS: A User's Guide to the Statistical Analysis System. Student supply stores, North Carolina State University, Sparks Press, 1972.

8. Beal, George M. & Daryl J. Hobbs. Social Action: The Process in Community and Area Development. Iowa Cooperative Extension Service Publication No. Soc.-16, 1969.

9. Bendel State Ministry of Economic Development. Directory of Establishments: Report on the Industrial Directory and Manpower Survey, Parts I & II. Benin-City, Nigeria: Bendel State Ministry, 1975.

10. Bendel State Ministry of Works and Transport. Bendel State of Nigeria Gazette, Bendel State Notice No. 20, No. 4, Vol. 15. Benin-City, Nigeria: Bendel State Government Printer, 25th January, 1978.

11. Bessire, Jack DeWitt. "The Development of Occupational Education in a Junior College and Student Interest." (Doctoral Dissertation, University of California, Berkeley, 1965). Dissertation Abstracts, 1966, no. 7, 3776.

12. Boyle, Frederick Henry. "A Study of Procedures Utilized in Planning Occupational Education Programs in Selected Florida Junior Colleges." (Doctoral Dissertation, The University of Florida, 1965). Dissertation Abstracts, 1966, 26, No. 10, 5805.

13. Burns, Richard Lyons. "Factors Governing the Establishment and Operation of Area Vocational-Technical Schools and Programs in the United States with Application to Missouri, 1964.

14. Burt, Samuel M. Industry and Vocational-Technical Education. A Study of Industry Education Advisory Committees. New York: McGraw-Hill Book Company, 1967.

15. Butcher, G. Dale. "Desirable Characteristics of Vocational Department Heads as Seen by Senior Administrators." Colorado Research Coordinating Unit, Fort Collins, Colorado, July, 1968. ERIC ED 024 804.

16. Casey, J. E. "What Does Business Want from Vocational Education?" American School Board Journal, 1966, 153, 54-55.

17. Colorado State Board. Colorado Vocational Act of 1970. Denver: State Board for Community Colleges and Occupational Education, Colorado. (Undated Document).

18. Cotrell, Calvin J., et al. Model Curricula for Vocational and Technical Teacher Education Teaching Career Analysis. Columbus: The Center for Vocational and Technical Education, Ohio State University, October, 1970.

19. Department of Public Instruction, Iowa. Proceedings on House Concurrent Resolution 142, Second Session 66th General Assembly State of Iowa, Recommendations on the Improvement of Vocational Education: Written Testimonies and Responses. Des Moines, Iowa: State of Iowa Department of Public Instruction, 1976.

20. Draper, Dale C. "Education for Work, National Committee Paper." A Report on Current Scene in Vocational Education. Washington, D.C.: The National Committee on Secondary Education of the National Association of Secondary School Principals, 1967.

21. Drost, Jim L. "Job Characteristics of Automotive Mechanics in Selected Iowa Dealerships and Garages." Ph.D. Dissertation, Iowa State University, Ames, 1970.

22. Engineering Manpower Commission. "Demand for Engineers and Technicians in 1966." Technical Education News, 1967, 26, No. 4, p. 7.

23. Fafunwa, A. Babs. A History of Higher Education in Nigeria. Nigeria: Macmillan & Co., Ltd., Lagos: Ilupeju Industrial Estate, 1971.

24. Fafunwa, A. Babs. History of Education in Nigeria. Plymouth, Great Britain: Clarke, Doble & Brendon Ltd., 1974.

25. Fafunwa, A. Babs. New Perspectives in African Education. Hong Kong: Lee Fung Printing Company Ltd., 1967.

26. Fasold, Jesse J. Guide to Structure and Articulation of Occupational Education Programs. State Department of Education, Division of Community Colleges and Vocational Education, Oregon State Department of Education, Salem, Oregon. (Undated).

27. Fibel, Lewis R. "Review and Synthesis of Literature on Occupational Preparation in the Community College." ERIC Clearinghouse on Vocational and Technical Education, The Center for Vocational and Technical Education, The Ohio State University, Columbus, Ohio, March, 1972.

28. Fishkind, Henry H., Jerome W. Milliman, and Richard W. Ellson. "Methodology for Determining Needs for Vocational and Technical Education in Urban Areas in Florida." Florida University, Gainsville College of Business Administration, Sponsored by Florida Advisory Council on Vocational and Technical Education, Tallahassee, Florida, September, 1976. ERIC ED 134 720.

29. Florida State Department of Education. The Florida Study of Vocational-Technical Education. Tallahassee, Florida: Florida State Department of Education, 1965.

30. Georgia Department of Labor. Georgia Skill Study. Complete edition. Atlanta, Georgia: Georgia Department of Labor, 1963.

31. Gillie, Angelo C. Principles of Post-Secondary Vocational Education. Columbus, Ohio: Charles E. Merrill Publishing Company, A Bell and Howell Company, 1973.

32. Goldstein, Harold. "America's Manpower Needs for the Seventies." American Vocational Journal, April 1971, 46, 18-25.

33. Good, Carter V., Editor. Dictionary of Education. 3rd edition. New York: McGraw Hill Book Company, 1973.

34. Harbison, Frederick, et al. Manpower Education. New York: McGraw-Hill Book Company, 1965.

35a. Harris, N. C. "Administration Leadership in Vocationa-Technical Education." Junior College Journal, 1962, 32, 380-387.

35b. Hussey, E.R.J. "Some Aspects of Education in Nigeria." Phelps-Stokes Reports on Education. London: Oxford University Press, 1962.

36. Ikejiani, Okechukwu, John W. Hanson, P. Uduarch Okeke & J. O. Anowi. Education in Nigeria. New York: Frederick A. Praeger, Publishers, 1965.

37. International Labour Office. CIRF Abstracts. Vol. 12. Geneva: International Labour Office, CIRF Publications, 1973.

38. Iowa State Department of Public Instruction. Iowa State Plan. For the Administration of Vocational Education Within Career Education, Part I. 1976-1977. Des Moines: Iowa State Department of Public Instruction, 1976.

39. Iowa Department of Public Instruction. Prioritizing Iowa's Training Needs. Department of Public Instruction, Career Education Division, Des Moines: Department of Public Instruction, Iowa, June, 1978.

40. Iowa State Department of Public Instruction. Vocational Education in Iowa Within Career Education. Des Moines: State of Iowa Department of Public Instruction, Career Education Division. (Undated Document). No. 6300-c27250-2/76.

41. Iowa State University. Region 'V', Past, Present and Future. Population Trends and Social Characteristics. Iowa Cooperative Extension Service, Publication No. CRD 100, July, 1975.

42. Johnson, Arthur H. and John L. Tait. The Burlington Area: Past, Present and Future. Population Trends with Social and Economic Characteristics. Iowa Cooperative Extension Service, Publication No. CRD 96, June, 1974.

43. Johnson, Arthur H. The Marshalltown Area, Past, Present and Future. Population Trends with Social and Economic Characteristics. Iowa Cooperative Extension Services, Publication No. CRD 99, October 1974.

44. Kennedy, Francis J. "A Study of Vocational and Technical Skill Needs in Lafourche Parish." Lafourche Parish School Board, Thibodaux, Louisiana, May, 1973. ERIC ED 110791.

45. Langerman, Philip Duane. "A Skilled Needs Survey with Implications for Vocational-Technical Education in Central Iowa." Unpublished Doctoral Dissertation, Iowa State University, Ames, 1968.

46. Lecht, Leonard A., et al. Changes in Occupational Characteristics in the Next Decade: Their Implications for Planning in Vocational Education. New York: Conference Board, Inc., April, 1976.

47. Lewis, L. J. Society, Schools, and Progress in Nigiera. Oxford: Pergamon Press, 1965.

48. Lotfipour, Khosrow. "A Study of Vocational-Technical Education in Iran (Tehran)." Unpublished Doctoral Dissertation, Iowa State University, Ames, 1977.

49. Lucas, John A. "Market Analysis of Proposed New Programs in a Growing Community College." Vol. V, No. 4. William Rainey Harper College, Palatine, Illinois, April, 1974. ERIC ED 111 481.

50. Makulu, H. F. Education, Development and Nation-Building in Independent Africa. A Study of the New Trends and Recent Philosophies of Education. London, Great Britain: SCM Press Ltd., 1971.

51. Matteson, Richard V. "The Relationship of Junior College Programs to the Employment Experiences of Graduates." School of Education, California University, Berkeley, California, 1966. ERIC ED 024 364.

52. Meleen, Paylette, et al. "Identifying and Planning for New and Emerging Occupations: A Suggested Guide." Washington, D.C.: Department of Health Education and Welfare, March, 1976. ERIC ED 137-516.

53. Meyers, Larry Duane. "A Skilled Needs Survey with Implications for Vocational-Technical Education Within the Iowa Western Community College District Area XIII Including Douglas and Sarpy Counties of Metropolitan Omaha, Nebraska." Unpublished Doctoral Dissertation, Iowa State University, Ames, Iowa, 1968.

54. Miller, Aron J. & Angelo C. Gillie. A Suggested Guide for Post-Secondary Vocational and Technical Education (Leadership Training Series No. 29). Columbus, Ohio:

55. Moore, Allen B. "Energy Problems Provide Job Opportunities." Washington, D.C.: Department of Health, Education and Welfare, July, 1977.

56. Nduka, Otonti. Western Education and the Nigerian Cultural Background. Ibadan Oxford University Press: University of Nigeria Nsukka, 1964.

57. News from Nigeria. Information Division, Nigeria Consulate General, New York, 1975, 4, No. 27, 13.

58. Nigeria Central Planning Office. "Third National Development Plans." Vol. I & II. Lagos: The Central Planning Office, Federal Ministry of Economic Development, 1975.

59. Okafor, Nduka. The Development of Universities in Nigeria. London: The Carmelot Press Ltd., 1971.

60. Okorie, John Umoji. "The Impact of Agricultural Education on Farm Production in Eastern Nigiera." Unpublished Doctoral Dissertation, Iowa State University, Ames, Iowa, 1974.

61. Osuala, Esogwa C. "The Development of Technical and Vocational Education in Nigeria with Implications for Meeting Intermediate Manpower Needs." Unpublished Doctoral Dissertation, University of Missouri, Columbia, Missouri, 1976.

62. Riendeau, Albert J. "The Role of Advisory Committee in Occupational Education in the Junior College. Washington, D.C.: American Association of Junior Colleges, 1967.

63. Scott, Robert Eugene. "Practicability of Establishing an Area Vocational School to Serve Five Northeastern Missouri Counties." Unpublished Doctoral Dissertation, University of Missouri, Columbia, Missouri, 1965.

64. Sheriff, El Mohamed. "A Proposed Plan for the Improvement of Vocational-Technical Education in Liberia." Unpublished Doctoral Dissertation, Iowa State University, Ames, Iowa, 1978.

65. Smith, Harold T. Education and Training for the World of Work, A Vocational Education Program for the State of Michigan. Kalamazoo, Michigan: The W. E. Upjohn Institute for Employment Research, 1963.

66. State of Iowa, Department of Public Instruction. "Guidelines for Secondary Cooperative Programs Preparatory Career Education." Des Moines, Iowa: Career Education Division, Department of Public Instruction (undated). Document No. 6320-B64733-11/74.

67. Stephens, E. Robert. A Proposal for Vocational Educational Education for the Counties of Benton, Cedar, Delaware, Iowa, Johnson, Jones, Linn, and Washington, State of Iowa. Cedar Rapids, Iowa: County Superintendent of Schools, Linn County Courthouse, 1965.

58. Tait, John L. & Arthur H. Johnson. The Davenport Area: Past, Present and Fugure. Population Trends with Social and Economic Characteristics. Iowa Cooperative Extension Service, Publication No. CRD 95, April, 1974.

69. Taiwo, C. O. "The Purpose of Secondary Education." West African Journal of Education, February 1970, 14, 27-30.

70. Teeple, John. "Implications of Career Openings in Health Occupations for Priorities in Vocation-Technical Education." Working Paper. Center for Priority Analysis, National Planning Association, Washington, D.C., October, 1968. ERIC ED 036 610.

71. Texas Educational Agency. Texas Supply/Demand Information System for Vocational Education. Final Report. Texas Educational Agency, Sponsored by Office of Education, Washington, D.C., 1976. ERIC ED 142-837.

72. The Industrial Relations Center and Iowa State Manpower Development Council. "Job Vacancies in Iowa Manufacturing Establishments." Vol. 1, No. 1. Industrial Relations Center, Iowa State University and Iowa State Manpower Development Council, Des Moines, Iowa, 1967.

73. Tyler, Hugh H., and Harold S. Fisher. "A Study of Job Demands and Curriculum Development in Agricultural Training Related to the Muskegon County Wastewater Management System." January, 1976. ERIC ED 137 544.

74. U.S. Department of Health Education and Welfare. Comprehensive Vocational Education Personnel Development and Utilization. Bureau of Adult, Vocational, and Technical Education, Office of Education, DHEW Publication No. (OE) 72-141. Washington, D.C.: U.S. Government Printing Office, 1972.

75. U.S. Department of Labor and Manpower Administration. Manpower and Operations Research Studies of the U.S. Employment Service and State Employment Services, 1958-1967. A Selected Bibliography, EES No. E261. Washington, D.C.: U.S. Department of Labor, 1958.

76. U.S. Department of Labor. Manpower, November 1972, 4, No. 11, 2-9.

77. U.S. Department of Labor. Manpower, April, 1976, 5, No. 4, 21-23.

78. U.S. Department of Labor. Statistics on Manpower, A Supplement to the Manpower Report of the President. Washington, D.C.: U.S. Department of Labor, March, 1969.

79. U.S. Department of Labor. Worklife. Vol. 1, No. 2. Washington, D.C.: U.S. Department of Labor, Employment and Training Administration, February, 1976.

80. U.S. Office of Education & American Technical Education Association. Proceedings of the National Clinic on Technical Education. Washington, D.C.: U.S. Office of Education, March 15-17, 1972.

81. Wolansky, William D. "Industrial Education and Construction Industry Team-Up." School Shop, October, 1974, 35, No. 2, 60-61.

82. Wolansky, William D. "Terminologies in Industrial Education." Mimeograph Paper. Department of Industrial Education, Iowa State University, Ames, Iowa, 1977.

ACKNOWLEDGMENTS

The author wishes to acknowledge the vital roles played by both government agencies and private individuals. The aid and assistance received during the course of this study was tremendous. It was therefore considered necessary at this point to express sincere appreciation for the outstanding roles played in this study by these individuals including government departments.

Firstly, recognition was accorded to the role played by Dr. W. D. Wolansky, my major professor/adviser, and head of Industrial Education Department. For his prudent advice, counsel and guidance the writer is indeed grateful. Sincere thanks were also extended to Dr. D. H. Schuster, professor of psychology and computer science, who suggested the appropriate statistical analysis and thereafter worked relentlessly and conscientiously to furnish the computer program which was utilized in analyzing the data.

The roles played by Dr. R. J. Bryan of Professional Studies, Dr. R. J. Gelina and Dr. J. N. Riley both of the Industrial Education Department, as members of my graduate committee were equally recognized. Their advice, counsel and constructive criticism of the research proposal were given high regard.

Secondly, the author wishes to extend his greetings to other lecturers in Industrial Education Department, such as

Dr. Miller, who exhibited sincere interest, concern and willingness to assist in finding solutions to problems which occurred from time to time during the course of the study, and who participated meaningfully in my overall course of training at Iowa State University.

Sincere thanks go to Bendel State Military Governor who gave the approval for the study to be conducted in the state, and the Governor's Office which sent letters to the State Ministries and Departments soliciting their cooperation in the study.

My gratitude is also extended to the entire staff of the Scholarship Branch of the Bendel State Ministry of Education for their genuine interest in the study, particularly Mr. D. O. Akhidenor who gave me a formal introductory letter to the employers who supplied the data for the study.

Special thanks go to Mrs. Victoria Omotejohwo Ighedo, my beloved wife, for the varied ways she encouraged and upheld me during the study, and for all that she suffered and endured during the eight weeks or more I stayed in Nigeria collecting data. Mrs. Ina Couture must be credited and congratulated for doing an outstanding job of typing the dissertation and for her patience, love and kindness.

God wonderfully protected my family and me, and made adequate provision for all our needs from the beginning to the end of my study. He is worthy of our praise and thanks.

"Thank you Lord"

APPENDIX A. COVER LETTERS AND QUESTIONNAIRES

Iowa State University of Science and Technology Ames, Iowa 50011

College of Education
Industrial Education
Telephone 515-294-1033

July 6, 1978

Dear Employer:

An important research study is being undertaken to determine the need for semi-skilled, skilled, and technician level manpower in Bendel State. The results of the study will help in making recommendations on educational programs designed to train skilled labor in your occopational field.

From the many contacts we made with your country, we came to know that one of the major problems facing vocational-technical education is not that it is a comparatively new educational field, but rather that employers of skilled labor are not playing any vital role in the development of technical programs. In order for technical education to adequately serve you, your needs must be made known to vocational-technical program/curriculum development experts. The main objective of this study is to determine what your manpower needs in your various occupational titles.

We have therefore advised your own person and a student in our department to undertake this study which will be of great benefit to you, the students, their parents, and Bendel State as a whole. The study hopes to determine the present manpower shortage in your occupational area and also to project what the need will be about five years or more from now. There is no other person or source that can provide the information required. Because of the importance of your organization in employing on a regular basis (at least four persons) it has been chosen for this study.

Realizing the length of the questionnaire and consequently the demand it will make on your busy schedule and the importance of every item on the questionnaire, we have to plead for your cooperation and help in completing the questionnaire. All information will be held in strict confidence and will be used only for the analysis of the State's needs. You might, if you wish, omit the section on your organizational name and address.

Sincerely,

William D. Wolansky
Professor and Head
Department of Industrial Education

Robert J. Gelina
Coordinator of Graduate Studies
Department of Industrial Education

WDW:hw

Telegrams: PERMEDUCAT. BENIN

Telephone: 696, 697 & 698

BENDEL STATE

MINISTRY OF EDUCATION
P.M.B. 1058
BENIN CITY
BENDEL STATE OF NIGERIA

Your Ref:
Our Ref: SCF.37/74/3

13 July, 1978

TO WHOM IT MAY CONCERN

MR. J. IGHEDO
GOVERNMENT SCHOLAR

I am directed to introduce the bearer, Mr. J. Ighedo, who is a postgraduate scholar at the Iowa State University of Science and Technology. He is currently on a Research trip to Nigeria.

3. I am to appeal to you to co-operate with him by making necessary facilities available to him, in addition to the completion of the questionnaire, he has with him.

(D.C. AFHIDENOR)
for Permanent Secretary,
(Scholarships Branch),
Higher Education Division.

MILITARY GOVERNOR'S OFFICE
(PUBLIC SERVICE MATTERS DEPARTMENT)
BENIN CITY
BENDEL STATE OF NIGERIA

233

Our Ref: No. CSM.151/47. 27/July, 1978.

The Secretary to the Military Government
and Head of Service,
Military Governor's Office,
Benin City.

The Permanent Secretary,
Ministry of Education,
Benin City.

The Permanent Secretary,
Ministry of Finance & Economic Development,
Benin City.

The Permanent Secretary,
Ministry of Trade, Industry & Co-operatives,
Benin City.

The Permanent Secretary
Ministry of Agriculture & Natural Resources,
Benin City.

The Permanent Secretary,
Ministry of Lands and Surveys,
Benin City.

The Permanent Secretary,
Ministry of Local Government & Chieftaincy Affairs,
Benin City.

The Solicitor-General and Permanent Secretary,
Ministry of Justice,
Benin City.

The Permanent Secretary,
Ministry of Information, Culture and Sports,
Benin City.

The Permanent Secretary,
Ministry of Works, Transport & Housing,
Benin City.

The Auditor-General,
Audit Department,
Benin City.

Mr. J. A. Ighedo:
Manpower Research Study in Bendel State

I wish to inform you that permission has been given for Mr. Joshua A. Ighedo, a research student in Iowa State University, U.S.A., to visit your Ministry/Department for the purpose of making references to some documents which may be relevant to his research programme stated above.

2. This letter supersedes my letter No. CSM.151/45 of 20th July, 1978.

(P. A. Uduebor)
for Secretary to the Military
Government and Head of Service.

MANPOWER NEEDS SURVEY QUESTIONNAIRE

Confidential Report:
Indicate:
1. Total number of persons on your payroll March 1978 _____
2. Total number of persons you estimate will be on your payroll by:
   (a) March 1980 _____; (b) March 1982 _____.

Name of Business _____

Business description
(product or service) _____

Business location _____

Instructions:
1. Only one copy of the questionnaire has been provided.
2. Fill out the questionnaire for both the skilled and technician workers in your establishment.
3. Please make an entry in each column for each available job title.

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
525.8851	Meat Dresser																			
412.886	Poultry Technician																			
525.387	Meat Grader																			
525.8852	Final Dressing Inspector																			
529.782	Dairy Processing Equipment Opr.																			
029.381	Laboratory Tester																			
022.168	Laboratory Supervisor																			
142.081	Floral Designer																			
407.138	Greens Superintendent																			
409.181	Tree Surgeon																			
404.884	Tree Pruner																			
406.887	Nursery Worker																			
262.358	Salesman Grain & Feed																			

Name and title of person completing questionaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(8)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
049.3842	Feed Research Aid																			
520.885	Ag. Feed Mixing Specialist																			
049.3841	Biological Aid																			
905.883	Truck Driver, Heavy																			
424.883	Sprayer																			
906.883	Liquid-Fertilizer Serviceman																			
276.358B	Salesperson, Gen. Hardware																			
168.287	Agricultural Commodity Grader																			
624.281	Farm Equipment Mechanic																			
624.282	Farm Equipment Mechanic Helper																			
624.381	Farm Machinery Setup Man																			
810.782	Agricultural Machinery Welder																			
223.388	Agricultural Machinery Parts Man																			
467.384	Artificial Breeding Technician																			
000.001	Farm Supervisor/Technician																			
~~000.002~~	~~Storage Technician~~																			
000.003	Bookkeeper																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

Confidential Report:
Indicate:
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2. Total number of persons you estimate will be on your payroll by:
   (a) March 1980 _____; (b) March 1982 _____.

Name of Business _____

Business description
(product or service) _____

Business location _____

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		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
620.281A	Automobile Mechanic																			
620.381	Automotive Tune-Up Mechanic																			
620.281B	Front End Alignment Man																			
620.281C	Transmission Mechanic																			
620.281D	Brakeman, Automobile																			
620.281E	Automobile Air Conditioning Mechanic																			
620.281F	Automobile Maintenance Mechanic																			
623.3872	Automotive Parts Man																			
607.381	Automobile Body Repairman																			
645.781	Automobile Spray Painter																			
615.867	Automobile Service Station Attendant																			
620.281G	Tractor Mechanic																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(8)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
625.281A	Gasoline Engine Repairman (2- and 4-cycle)																			
625.281B	Diesel Mechanic																			
620.281H	Transmission Mechanic (Diesel)																			
625.281C	Fuel Injection Serviceman (Diesel)																			
862.381	Pipe Fitter, Diesel Engine																			
904.883	Tractor-Trailer Truck Driver																			
906.883	Light Truck Driver																			
915.884	Tire Repairman																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

Confidential Report:

Indicate:

1. Total number of persons on your payroll March 1978 _____
2. Total number of persons you estimate will be on your payroll by:
   (a) March 1980 _____; (b) March 1982 _____.

Name of Business _____

Business description (product or service) _____

Business location _____

Instructions:

1. Only one copy of the questionnaire has been provided.
2. Fill out the questionnaire for both the skilled and technician workers in your establishment.
3. Please make an entry in each column for each available job title.

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
001.281	Draftsman, Architectural																			
003.281B	Draftsman, Electrical																			
017.281	Draftsman, Map																			
160.288	Estimator																			
860.131	Carpenter Foreman																			
860.381	Carpenter																			
864.781	Floor Layer																			
864.381	Roofer																			
862.318A	Plumber																			
862.381B	Pipe Fitter																			
861.381	Bricklayer (Mason)																			
824.281	Electrician																			
869.381	House Repairman																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(8)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
842.781	Plasterer																			
859.883A	Heavy Equipment Operator (Operating Engineer)																			
850.883A	Bulldozer Operator																			
859.883B	Dragline Operator																			
850.883B	Power Shovel Operator																			
620.282B	Heavy Equipment Mechanic																			
620.282A	Construction Equipment Mechanic																			
869.131	Concreting Foreman																			
570.132	Concrete Batching and Mixing Plant Foreman																			
570.885	Concrete Mixer Operator																			
852.883A	Concrete Paver Operator																			
852.883B	Concrete Paving Machine Opr.																			
900.883	Concrete Mixing Truck Driver																			
821.381	Lineman																			
869.884	Construction Worker																			
801.781	Structural-Steel Worker																			

Name and title of person completing questionniare

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

Confidential Report:
Indicate:
1. Total number of persons on your payroll March 1978 _____
2. Total number of persons you estimate will be on your payroll by:
   (a) March 1980 _____; (b) March 1982 _____.

Name of Business _____

Business description
(product or service) _____

Business location _____

Instructions:
1. Only one copy of the questionnaire has been provided.
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		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
600.280A	Machinist																			
601.280	Tool and Die maker																			
609.381	Inspector, Floor																			
201.281	Inspector, gage																			
609.684	Inspector, General																			
609.380A	Engine Lathe Set-Up Operator																			
604.380	Turret Lathe Set-Up Operator																			
605.885	Milling Machine Set-Up Operator																			
616.380B	Set-Up Man (Job Setter)																			
616.380C	Die Setter																			
603.280	Grinding Machine Operator																			
604.782	Screw Machine Set-Up Operator																			
606.782	Drill Press Operator																			

Name and address of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(8)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
518.782	Machine Molder																			
518.381	Coremaker																			
638.281	Maintenance Mechanic																			
600.381	Lay-Out Man																			
600.280B	Patternmaker, Metal																			
693.281	Patternmaker, Metal, Bench																			
604.281	Sheet Metal Worker																			
504.782	Heat Treater																			
741.884	Painter, spray																			
811.884	Welder, Gas																			
810.884A	Welder, Arc																			
812.887	Welder, Combination																			
810.884B	Welder, Heliarc (Gas-shielded)																			
810.782	Welding Machine Operator, Arc																			
950.782	Stationary Engineer																			
011.281	Metallurgist, Asst. (Tech.)																			
007.281	Draftsman, Mechanical																			
003.181A	Electrical Technician																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(8)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
710.281	Electro-Mechanical Technician																			
007.181	Mechanical Engineering Technician																			
022.281	Chemical Laboratory Technician																			
003.281A	Instrumentation Technician																			
003.181B	Electronic Technician																			
001.281	Draftsman, Architectural																			
003.281B	Draftsman, Electrical																			
003.281C	Draftsman, Electronic																			
017.281	Draftsman, Map																			
617.280	Press Operator Sheet Metal																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

Confidential Report:
Indicate:
1. Total number of persons on your payroll March 1978 _____
2. Total number of persons you estimate will be on your payroll by:
   (a) March 1980 _____; (b) March 1982 _____.

Name of Business _____

Business description
(product or service) _____

Business location _____

Instructions:
1. Only one copy of the questionnaire has been provided.
2. Fill out the questionnaire for both the skilled and technician workers in your establishment.
3. Please make an entry in each column for each available job title.

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
659.130	Foreman, Printing Shop																			
651.782A	Offset Pressman																			
207.7822	Multilith Operator																			
651.782B	Platen Pressman																			
650.582	Linotype Operator																			
973.381A	Compositor (Typographer)																			
979.884	Silk Screen Printer																			
973.381B	Job Printer																			
791.381	Photoengraver																			
972.382	Photographer (Lithographic)																			
143.062	Photographer (News)																			
653.782	Folding Machine Operator																			
627.281	Linotype Machinist																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(8)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
977.884	Bookbinder																			
142.081	Commercial Artist																			
699.782	Cutter Operator																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

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Business description
(product or service) _____

Business location _____

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		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
637.281C	Refrigeration Mechanic																			
637.281A	Air-Conditioning Mechanic Com.																			
637.281B	Air-Conditioning Mech., Dom.																			
869.281	Furnace Installer & Repairman, Hot Air																			
633.281	Office Machine Serviceman																			
720.281	TV & Radio Service & Repairman																			
828.281	Electronics Mechanic																			
721.281	Electric Motor Repairman																			
723.884	Electrical Appliance Repairman																			
710.281	Instrument Repairman																			
700.281	Jeweler																			
715.281	Watch Repairman																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

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		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
201.3681	Secretary																			
202.388	Stenographer																			
208.588	Transcribing Machine Operator (Dictaphone)																			
203.588	Typist and Clerk Typist																			
237.368	Receptionist																			
235.862	Telephone Operator (PBX Opr)																			
209.588	General Clerk																			
222.387	Shipping and Receiving Clerk																			
223.3871	Stock Clerk																			
207.7821	Duplicating Machine Operator																			
208.885	Collator Operator																			
214.488A	Accounting Clerks																			
214.488B	Billing Machine Operator																			

Name and title of person completing questionnaire

Date

MANPOWER NEEDS SURVEY QUESTIONNAIRE

D.O.T. code # (office use only)	Job title	Previous number of employees				Present number of employees; from:				Current number of vacancies requiring trained workers	Anticipated employment (total number of workers)		Approximate percent (of employees) leaving employment due to death, resignation, retirement, or promotion (per year)	Current number of trainees	Number completing training by:			Check present supply of (in-plant and public school) trained workers 1 - short 2 - adequate 3 - surplus		
		1974	1975	1976	1977	Public vocational-technical schools	Apprenticeship training programs	Your in-plant training program	Other countries		Mar. 1980	Mar. 1982			1978	1980	1982	1	2	3
(4)	(5)	(6)	(7)	(8)	(8)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
210.388	Bookkeeper																			
215.388	Bookkeeping Machine Operator																			
216.488	Calculating Machine Operator																			
216.388	Statistical Clerks and Compilers																			
188.188	Assessor																			
168.168	Building Inspector																			
162.158	Purchasing Agent																			
729.281	Electric-Meter Repairman																			
824.381	Street-Light Serviceman																			
249.368	Library Assistant																			
899.381	Maintenance Man																			
620.282	General Purpose Mechanic																			
812.884	Welder Combination																			
860.381	Carpenter																			
862.381A	Plumber																			
824.281	Electrician																			
143.382	Photographer																			
199.288	Traffic Technician																			

Name and title of person completing questionnaire

Date

AGRICULTURAL RELATED JOB DESCRIPTIONS

D.O.T. code no.	
525.8841	Meat Dresser--Butchers livestock, such as hogs, sheep and cattle, in private slaughter house or on customer's premises.
412.886	Poultry Technician--Inspects poultry farms to insure that growers comply with contract standards for feeding and housing birds and controlling diseases.
525.387	Meat Grader--Examines animal carcases to grade them in terms of sales value.
525.8842	Final Dressing Inspector--Inspects dressed animal carcases for defects and cuts out defective portions following established procedure.
529.782	Dairy Processing Equipment Operator--Sets up and operates continuous flow or vat-type equipment to process milk, cream, and other dairy products.
029.381	Laboratory Tester--Performs standardized tests to determine quality or quantity of physical or chemical properties in food products or to insure compliance with company and government quality standards.
022.168	Laboratory Supervisor--Supervises and correlates activities of workers engaged in performing routine chemical properties in food products or to insure compliance with company and government quality standards.
142.081	Floral Designer--Designs and fashions floral pieces and decorations with selections of natural and artificial flowers and foliage.
407.138	Greens Superintendent--Supervises and coordinates activities of workers engaged in constructing new areas and preserving golf course grounds.
409.181	Tree Surgeon--Prunes and treats ornamental and shade trees and shurbs in yards and parks to improve their appearance, health and value.
404-884	Tree Trainer--Cuts away dead and excess branches from fruit, nut and shade trees.
406.887	Nursery Worker--Plants, cultivates and harvests trees, shrubs and ornamental flowering plants in nursery.

262.358 Salesman Grain & Feed--Sells grain and feed-mill products such as flour, feed, meal and cereals

049.3842 Feed Research Aid--Feeds rations of experimental feeds to animals such as poultry, pigs and cows and compiles data on growth, productivity and health of animals.

520.885 Ag Feed Mixing Specialist--Tends machine that mixes stock or poultry feed according to formula and transfers it to packing machine or storage area.

049.3841 Biological Aid--Aids research workers to carry out experiments in bacteriology, performing routine tests and experiments concerned with greenhouses, experimental plots, hives of bees and experimental equipment.

905.883 Truck Driver, Heavy--Drives truck with capacity of more than three tons, to transport materials in liquid, packaged or bulk form to farm or plant.

424.883 Sprayer--Sets up and operates equipment to dust tree crops, ground crops and livestock with liquid or powdered pesticides, fertilizers, herbicides, or hormones.

906.883 Liquid-Fertilizer Serviceman--Drives truck to deliver liquid fertilizer to field location and pumps fertilizer into tractor-drawn applicator tank.

276.358B Salesperson, General Hardware--Displays and sells hardware, such as electrical equipment, gardening tools and equipment, and paints to individuals.

168.287 Agricultural Commodity Grader--Inspects fresh fruits and vegetables, grains, nursery stock and other horticultural products, handled, stored, packed, shipped or sold.

624.281 Farm Equipment Mechanic--Maintains, repairs and overhauls farm machinery, equipment and vehicles, such as tractors, harvesters, pumps, tilling equipment; electrically powered or motor-driven equipment; on farms or in farm equipment repair shops.

624.282 Farm Equipment Mechanic Helper--Assists the farm equipment mechanic in repairing and overhauling machinery and mechanical equipment.

624.381 Farm Machinery Setup Man--Erects and assembles farm machinery for use in field. Uncrates components at freight station or dealer's warehouse. Assembles and adjusts machinery according to specifications.

810.782 Agricultural Machinery Welder--Sets up and operates arc or gas welding machines which automatically welds together parts of broken metal for repair or alteration.

223.388 Agricultural Machinery Parts Man--Receives, stores and issues equipment, material, supplies or tools, and compiles records in stock room, warehouse, or storage.

467.384 Artificial Breeding Technician--Collects and packages bull serum for artificial insemination of cows.

000.001 Farm Supervisor/Technician--Directs, coordinates and supervises the activities of workers engaged in clearing, grubbing, ridging, manuring, planting and harvesting.

000.002 Storage Technician--Chemically or otherwise treats crops for the purpose of preserving them against the next planting season.

000.003 Bookkeeper--Assist the professional person (the agricultural economist) in keeping cost and determining sales prices.

AUTOMOTIVE AND DIESEL JOB DESCRIPTIONS

D.O.T. Code No.

620.281A Automobile Mechanic--Repairs motor vehicles, performing such duties as disassembling and overhauling engines, transmissions, clutches, rear ends and other assemblies.

620.381 Automotive Tune-Up Mechanic--Performs minor repair and tune-up of motor vehicles.

620.281B Front End Alignment Man--Aligns wheels, axles, frames, torsion bars and steering mechanisms of automotive vehicles.

620.281C Transmission Mechanic--Repairs and installs manual and automatic transmissions in automotive vehicles.

620.281D Brakeman, Automobile--Repairs and overhauls brake systems in automobiles, buses, trucks and other automotive vehicles.

620.281E Automobile Air Conditioning Mechanic--Installs and repairs automotive air conditioning units.

620.281F Automobile Maintenance Mechanic--Inspects, repairs and maintains functional parts of automotive equipment.

623.3872 Automotive Parts Man--Purchases, stores and issues spare parts for automotive equipment. Keeps records of parts received and issued or sold and inventories parts periodically.

607.381 Automobile Body Repairman--Examines damaged automotive vehicles and estimates cost of repairs. Repairs or replaces damaged bodies and body parts.

645.781 Automobile Spray Painter--Removes old paint from automotive vehicle or damaged or repaired portion of vehicle and repaints with spray gun.

615.867 Automobile Service Station Attendant--Services automobiles, buses, trucks and other automotive vehicles with fuel, lubricants and accessories.

620.281C Tractor Mechanic--Diagnoses mechanical failures of and repairs tractors and tractor components according to manuals, factory specifications and knowledge of engine performances, using handtools, power tools and testing instruments.

625.281A Gasoline Engine Repairman (2- and 4-cycle--Repairs fractional horsepower gasoline engines used to power boats, lawnmowers, brushsaws, garden tractors and similar machines, using handtools.

625.281B Diesel Mechanic--Diagnoses trouble, disassembles diesel engines and examines parts for defects and excessive wear. Reconditions, replaces, repairs and maintains diesel engines used to power machines, using handtools, precision-measuring instruments and metalworking tools.

620.281H Transmission Mechanic (Diesel)--Repairs and installs manual and automatic transmissions in trucks, buses and industrial equipment.

625.281C Fuel Injection Serviceman (Diesel)--Rebuilds, tests and calibrates fuel injection units as used on diesel engines, railroad locomotives, trucks, construction equipment, tractors and power plants.

862.381 Pipe Fitter, Diesel Engine--Installs oil, air, fuel and water lines on diesel engines, using blueprints and process documents to determine pipe size, location of connection and angles of bends.

904.883 Tractor-Trailer Truck Driver--Drives gasoline or diesel-powered tractor-trailer combination, usually over the road (long distances on highways), to transport and deliver goods, livestock or materials in liquid, loose or packaged form.

906.883 Light Truck Driver--Drives truck with capacity under three tons to transport materials in liquid or packaged form and personnel to and from specified destinations.

915.884 Tire Repairman--Repairs damaged tires of automobiles, buses, and trucks with the use of hydraulic jack or power hoist, water bath, rubber mallet, metal bar or mechanical tire changer.

CONSTRUCTION INDUSTRY JOB DESCRIPTIONS

D.O.T. code no.	
001.281	Draftsman, Architectural--Performs duties of draftsman by planning artistic architectural and structural features of any class of buildings and like structures.
003.281B	Draftsman, Electrical--Performs duties of draftsman in preparing electrical equipment working drawings and wiring diagrams used by construction crews and repairmen who erect, install and repair electrical equipment and wiring in powerplants, industrial establishments, commercial or domestic buildings, or electrical distribution systems.
017.281	Draftsman, Map--Draws maps of cities, counties, states and other areas showing location and identity of roads, communities, commercial or industrial structures and installations, political boundaries and other features.
160.288	Estimator--Prepares cost and work completion estimates for engineering contract bids. Computes cost estimates of raw materials, purchased equipment, or subcontracted work and labor.
860.131	Carpenter Foreman--Supervises and coordinates activities of workers engaged in construction, installation and repair of wooden structures and fixtures.
860.381	Carpenter--Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard, using carpenter's hand tools and power tools, and conforming to local building codes.
864.781	Floor Layer--Applies blocks, strips or sheets of shock absorbent, sound-deadening or decorative covering to floors, walls and cabinets.
866.381	Roofer--Covers roofs with roofing materials, other than sheet metal, such as composition shingles or sheets, wood shingles or asphalt and gravel, to make them waterproof.
862.381A	Plumber--Assembles, installs and repairs pipes, fittings and fixtures of heating, water and drainage systems, according to specifications and plumbing codes.
862.381B	Pipe Fitter--Lays out, fabricates, assembles, installs and maintains piping and piping systems, fixtures and equipment for steam, hot water, heating, cooling lubricating, and industrial processing systems, on basis of knowledge of system operation and study of building plans or working drawings.

861.381 Bricklayer (Mason)--Lays building materials, such as brick, structural tile and concrete cinder, glass gypsum and terra cotta block to construct or repair walls, partitions, arches, sewers and other structure.

824.281 Electrician--Plans layout and installs and repairs wiring, electrical fixtures, apparatus and control equipment.

869.381 House Repairman--Repairs and remodels houses and small buildings, according to blueprints or oral instructions. May hire workers to perform tasks for which he is not equipped or does not hold license so that construction or repairs will conform to local building regulations.

842.781 Plasterer--Applies coats of plaster to interior walls, ceilings and partitions of buildings to produce finished surface, according to bludprint, architect's drawings or oral instructions.

859.88sA Heavy Equipment Operator (Operating Engineer)--Operates several types of power construction equipment, such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, to excavate and grade earth, erect structural and reinforcing steel, and pour concrete.

850.883A Bulldozer Operator--Operates tractor equipped with concave blade attached across front to gouge out level, and distribute earth and to push trees and rocks from land for constructing roads and buildings or planting crops.

859.883B Dragline Operator--Operates power-drive crane equipped with dragline bucket, suspended from boom by cable that is dragged toward crane to excavate or move sand, gravel, clay, mud, coal or other materials.

850.88sB Power Shovel Operator--Operates power driven machine equipped with moveable shovel, to excavate and move coal, dirt, rock, sand and other materials.

620.282B Heavy Equipment Mechanic--Analyzes malfunction and rebuilds, repairs and adjusts heavy construction equipment other than internal combustion engines, such as cranes, power shovels, scrapers, paving machines, motor graders, rock crushers, trench-digging machines, conveyors, and bulldozers.

620.282A Construction Equipment Mechanic--Maintains, repairs and rebuilds, to conform to factory specifications, construction equipment, such as internal combustion engines, lighting plants, pumps, air compressors, concrete vibrators and equipment to diagnose defects.

869.131 Concreting Foreman--Supervises and coordinates activities of work crews engaged in preparing and applying concrete for fabricating, covering and reinforcing structures, including buildings, bridges, highways and dams.

570.132 Concrete Batching and Mixing Plant Foreman--Supervises and coordinates activities of workers engaged in transporting and mixing ingredients to make concrete.

570.885 Concrete Mixer Operator--Tends mixing machine to mix sand, gravel, cement and water to make concrete.

852.883A Concrete Paver Operator--Operates machine to mix and pour concrete into forms for paving highways. May clean, adjust, grease and repair paver and attachment.

852.883B Concrete Paving Machine Operator--Operates concrete paving machine to spread and smooth freshly poured concrete

900.883 Concrete Mixing Truck Driver--Drives truck equipped with auxiliary concrete mixer. Dumps concrete into chute leading to form, and cleans truck after delivery.

821.381 Lineman--Erects wood poles and prefabricated light-duty metal towers, cable and related equipment to construct transmission and distribution powerlines used to conduct electrical energy between generating stations, substations and consumers.

869.884 Construction Worker--Performs any combination of duties on construction projects, usually working in utility capacity, by transferring from one task to another task where demands require worker with varied experience and ability to work without close supervision.

801.781 Structural-Steel Worker--Performs any combination of duties to raise, place and unite girders, columns, and other structural-steel members of form completed structures or structure frameworks, working as a member of a crew.

MACHINE AND INDUSTRIAL JOB DESCRIPTIONS

D.O.T. code no.

600.280A Machinist--Sets up and operates machine tools, and fits and assembles parts to make or repair metal parts, mechanisms, tools or machines, applying knowledge of mechanics, shop mathematics, metal properties and layout machining procedures.

601.280 Tool and Die Maker--Analyzes variety of specifications, lays out metal stock, sets up and operates machine tools, and fits and assembles parts to make and repair metalworking dies, cutting tools, jigs, fixtures, gages and machinists' hand tools, applying knowledge of tool and die designs and construction, shop mathematics, metal properties, and layout, machining and assembly procedures.

609.381 Inspector, Floor--Tests or examines machinery parts, materials and assemblies at assembly, inspection or machining stations to insure conformance to blueprint or other specifications. May be specified according to manufacturing process, such as forging, assembly, stamping or machining; or by type of product inspected.

601.281 Inspector, Gage--Inspects and adjusts gages, measuring instruments, and testing equipment for conformance to blueprint specifications.

609.684 Inspector, General--Inspects materials and products, such as connecting rods, sheet steel, piston rings, carburetors and thermostats, for conformance to specifications, using fixed or preset measuring instruments.

609.380A Engine Lathe Set-Up Operator--Sets up and operates engine lathes to perform machining operations, such as turning, boring, threading and facing on metallic or nonmetallic workpieces according to specifications, tooling instructions, standard charts and knowledge of machining procedures.

604.380 Turret Lathe Set-Up Operator--Sets up and operates turret lathes to perform series of machining operations, such as turning, boring, threading and facing, on metal workpieces, such as castings, forgings and weldments, according to specifications, tooling instructions, standard charts and knowledge of turning procedures.

605.885 Milling Machine Set-Up Operator--Tends one or more milling machines to mill surfaces of metal workpieces to specifications on production basis.

616.380B Set-Up Man (Job Setter)--Sets up various metal fabricating machines, such as brakes, shears, punch presses and bending and straightening machines to cut, bend and straighten metal as specified by layout, workorder, blueprints and templates.

616.380C Die Setter--Sets up machines common to sheet metal shop, such as forming, edging, crimping, slitting, riveting, spot-welding, automatic and multi-purpose machines to cut, bend, form, and join together sheet metal.

603.280 Grinding Machine Operator--Sets up and operates grinding machines, such as surface and universal, carbide, drill and tool-and cutter grinders, to sharpen cutting tools to specifications, using knowledge of abrasives and metal properties.

604.782 Screw Machine Set-Up Operator--Sets up and operates one or more single- or multiple-spindle lathe-type screw machines equipped with automatic indexing and feeding mechanisms to perform turning, boring, threading and facing operations on metal bar stock on production basis, following specifications and tooling instructions and applying knowledge of screw machine operations.

606.782 Drill Press Operator--Sets up and operates drilling machines, such as single- or multiple-spindle drill presses to drill, ream, countersink, spot-face or tap holes in metal or nonmetal workpieces to specifications on production basis.

518.782 Machine Molder--Operates molding machine to form sand molds used in production of metal castings.

518.381 Coremaker--Makes sand cores used in molds to form holes or hollows in metal castings.

638.281 Maintenance Mechanic--Repairs and maintains, in accordance with diagrams, sketches, operation manuals and manufacturer's specifications, machinery and mechanical equipment, using handtools, power tools and precision-measuring instruments.

600.381 Lay-Out Man--Lays out metal stock or workpieces, such as castings, plates or machine parts, to indicate location and dimensions of processing to be done, such as machining, welding or assembly, analyzing specifications and computing dimensions according to knowledge of product, subsequent processing, shop mathematics and layout procedures.

600.280B Patternmaker, Metal--Lays out, machines, fits and assembles castings and parts to make metal foundry patterns, core boxes, and match plates, using handtools and machine tools, and analyzing specifications according to knowledge of patternmaking methods.

693.281 Patternmaker, Metal, Bench--Fits, assembles and hand finishes castings and parts in making metal foundry patterns, using hand-tools and analyzing specifications according to knowledge of patternmaking methods.

604.281 Sheet Metal Worker--Fabricates, assembles, installs and repairs sheet metal products and equipment, such as control boxes, drain-pipes, ventilators and furnace casings, according to job order or blueprints.

504.782 Heat Treater--Controls heat-treating furnaces and quenching equipment to alter physical and chemical properties of variety of metal objects by methods of controlled heating and cooling, such as hardening, tempering, annealing, case-hardening and normalizing.

741.884 Painter, Spray--Sprays surfaces of machines, manufactured products of working area with protective or decorative materials, such as paint, enamel, or lacquer, using spray gun.

811.884 Welder, Gas--Welds metal parts together, as specified by layout, welding diagram or work order, using gas welding equipment.

810.884A Welder, Arc--Welds metal parts together, as specified by layout, diagram, work order, or oral instructions, using electric arc welding equipment.

612.887 Welder, Combination--Welds metal parts together, according to layouts, blueprints or work orders, using both gas welding or brazing and any combinstion of arc welding processes. Performs related tasks, such as flame cutting and grinding.

810.884B Welder, Heliarc (Gas-Shielded Arc)--Welds metal, using equipment which introduces shield of inert or noncombustible gas, such as helium, argon, carbon dioxide or nitrogen, around electric arc between electrode and workpiece to prevent oxidation.

810.782 Welding Machine Operator, Arc--Sets up and operates arc welding machine which automatically welds together parts of fabricated metal products, as specified by blueprints, layouts and operating charts.

950.782 Stationary Engineer--Operates and maintains stationary engines and mechanical equipment, such as steam engines, air compressors, generators, motors, turbines and steam biolers, to provide utilities, such as light, heat or power, for buildings and industrial processes.

011.281 Metallurgist, Assistant (Technician)--Examines and tests metal samples to determine their physical properties, under direction of metallurgist. Tests samples in pressure devices, hot-acid baths and other apparatus to determine strength, hardness, elasticity, toughness or other properties of metal.

007.281 Draftsman, Mechanical--Performs duties of draftsman specializing in drafting detailed working drawings of machinery and mechanical devices, indicating dimensions and tolerances, fasteners and joining requirements, and other engineering data.

003.181A Electrical Technician--Applies electrical theory and related subjects to test and modify development or operational electrical machinery and electri-control equipment and circuitry in industrial or commercial plants and laboratories.

710.281 Electro-Mechanical Technician--Fabricates, tests, analyzes and adjusts precision electro-mechanical instruments, such as temperature probes and aerodynamic probes, following blueprints and sketches, using handtools, metalworking machines, and measuring and testing instruments.

007.181 Mechanical Engineering Technician--Applies theory and principles of mechanical engineering to develop and test machinery and equipment under direction of engineering staff and physical scientists.

022.281 Chemical Laboratory Technician--Conducts chemical and physical laboratory tests and makes qualitative and quantitative analyses of materials and purposes such as development of new products, materials, and processing methods, and for maintenance of health and safety standards, working under the direction of a chemist.

003.281A Instrumentation Technician--Devises, sets up and operates electronic instrumentation and related electromechanical or electrohydraulic apparatus involved in operational and environmental testing of mechanical, structural, or electrical equipment, and translates test data for subsequent use by engineering personnel in making engineering design and evaluation decisions.

003.181B Electronic Technician--Applies electronic theory, principles of electrical circuits, electrical testing procedures, engineering mathematics, physics, and related subjects to layout, build, test, troubleshoot, repair and modify developmental and production electronic equipment, such as computers, missile-control instrumentation and machine tool numerical controls.

001.281 Draftsman, Architectural--Performs duties of draftsman by planning artistic architextural and structural features of any class of buildings and like structures.

003.281B Draftsman, Electrical--Performs duties of draftsman in preparing electrical equipment working drawings and wiring diagrams used by construction crews and repairmen who erect, install and repair electrical equipment and wiring in power plants, industrial establishments, commercial or domestic buildings, or electrical distribution systems.

003.281C Draftsman, Electronic--Drafts wiring diagrams, schematics and layout drawings used in manufacture, assembly, installation and repair of electronic equipment, such as television cameras, radio transmitters and receivers, audioamplifiers, computers and radiation detectors.

017.281 Draftsman, Map--Draws maps of cities, counties, states and other areas showing location and identity of roads, communities, commercial or industrial structures and installations, political boundaries and other features.

617.280 Press Operator Sheet Metal--Sets up and operates powerpress to bend, form and straighten metal plates, structural shapes, forgings, and weldments as specified by blueprints, layout and templates.

PRINTING, PUBLISHING AND ALLIED INDUSTRIES
JOB DESCRIPTIONS

D.O.T.
Code No.

659.130 Foreman, Printing Shop--Supervises and coordinates activities of workers engaged in laying out copy, setting type, operating presses and assembling and stitching pamphlets, leaflets and books.

651.782A Offset Pressman--Makes ready and operates offset printing press to print single and multicolor copy from lithographic plates.

207.7822 Multilith Operator--Operates offset duplicating machine to reproduce single or multicolor copies of charts, schedules, bulletins and related matter, according to oral instructions or layout and stock specifications on job order.

651.782B Platen Pressman--Prepares and operates platen type printing press to produce printed material.

650.582 Linotype Operator--Operates machine to cast complete lines of type from type metal and deposit them in galley in composed form for printing.

973.381A Compositor (Typographer)--Sets type by hand and machine and assembles type and cuts in a galley, for printing articles, headings and other printed matter, determining type size, style and compositional pattern from work order.

979.884 Silk Screen Printer--Prints lettering and designs on objects using silk screen printing machine.

973.381B Job Printer--Sets copy according to copy and operates cylinder or automatic platen press to print complete job order.

971.381 Photoengraver--Photographs copy, develops negatives and prepares photosensitized metal plates, such as copper, zinc, aluminum and magnesium for use in printing. Modifies and repairs finished plates, using engraver's handtools, etching brush and acid.

972.382 Photographer (Lithographic)--Sets up and operates camera to photograph illustrations and printed material to produce film or glass negatives, or reversed negatives used in the preparation of lithographic printing plates.

143.062 Photographer (News)--Photographs news events or people for use in illustrating news stories and articles. Travels to assigned location and takes pictures, using camera.

653.782 Folding Machine Operator--Operates machine that automatically folds and slits printed sheets into signatures for binding.

627.281 Linotype Machinist--Adjusts and repairs linotype machines and related equipment, according to maintenance schedule, diagnosis of machine malfunctioning and manufacturer's service manuals.

977.884 Bookbinder--Binds covers to books or pamphlets and performs book finishing operations, determining production procedures from job order.

142.081 Commercial Artist--Draws and paints illustrations for advertisements, books, magazines, posters, billboards, and catalogs.

699.782 Cutter Operator--Operates cutting machine equipped with rotary of reciprocating blades to cut rolls of material such as paper, paperboard, cellophane or plastic, into sheets, according to specifications.

SERVICE INDUSTRY

D.O.T. Code No.

637.281C Refrigeration Mechanic--Installs and repairs industrial and commercial refrigerating and cooling systems according to blueprints and engineering specifications, using knowledge of refrigeration, structural layout and function and design of components.

637.281A Air-Conditioning Mechanic Commercial--Installs, services, and repairs commercial air-conditioning units, usually rated in excess of 100 tons cooling capacity, in department stores, office buildings and other large commercial establishments, utilizing knowledge of refrigeration theory, pipefitting and structural layout. Mounts compressor and condenser units on platform or floor, using handtools, following blueprints or engineering specifications.

637.281B Air-Conditioning Mechanic, Domestic--Services and repairs domestic air-conditioning units, usually ranging from ½ to 2 tons capacity, in private residences and small business establishments; examines unit visually for defective parts, or determines cause of malfunction by listening to machine in operation, utilizing knowledge of mechanical, electrical, and refrigeration theory.

869.281 Furnace Installer and Repairman, Hot Air--Installs and repairs hot-air furnaces, stoves and similar equipment in accordance with diagrams and other specifications, using handtools and pipe-threading tools.

633.281 Office Machine Serviceman--Repairs and services office machines, such as adding, accounting and calculating machines, and typewriters, using handtools, power tools, micrometers and welding equipment.

720.281 Television and Radio Service and Repairman--Repairs and adjusts radios and television receivers, using handtools and electronic testing instruments. May install television sets.

828.281 Electronics Mechanic--Repairs electronic equipment, such as computers, industrial controls, radar systems, telemetering and missle missile control systems, transmitters, antennas and servomechanisms, following blueprints and manufacturers' specifications, using handtools and test instruments.

721.281 Electric Motor Repairman--Repairs electric motors, generators and accessory equipment, such as starting devices and switches, using handtools, power tools, precision gages and electricl test instruments.

773.884 Electrical Appliance Repairman--Repairs portable, household electrical appliances, such as fans, heaters, vacuum cleaners toasters and flatirons.

710.281 Instrument Repairman--Installs, repairs, maintains and adjusts indicating, recording, telemetering and controlling instruments used to measure and control variables, such as pressure, flow, temperature, motion, force and chemical composition, using handtools and precision instruments.

700.281 Jeweler--Fabricates and repairs jewelry articles, such as rings, brooches, pendants, bracelets and lockets.

j15.281 Watch Repairman--Repairs, adjusts and cleans stop watches, dial indicators and die heads, using watchmakers' tools and jewelers' lathes according to written and oral instructions.

BUSINESS AND OFFICE JOB DESCRIPTIONS
INCLUDING GOVERNMENT DEPARTMENTS

D.O.T.
Code No.

201.3681 Secretary--Performs general office work in relieving executives of minor executive and clerical duties. Takes dictation and transcribes material to the typewritten page.

202.388 Stenographer--Takes dictation in shorthand of correspondence, reports and other matters and transcribes dictated material to the typerwritten page. May perform a variety of related clerical duties.

208.588 Transcribing Machine Operator (Dictaphone)--Transcribes the message reproduced in sound from the wax or tape record on a transcribing machine.

203.588 Typist and Clerk Typist--Does general clerical work; requires the use of typewriter in the accomplishment of a majority of the duties. Typewrites letters, reports and other matter from rough draft or corrected copy. Files records and reports. May perform one or a combination of clerical duties as assigned.

237.268 Receptionist--Receives clients or customers coming into establishment. Ascertains their wants and directs them accordingly.

235.862 Telephone Operator (PBX Operator)--Operates telephone switchboard (cord or cordless) to relay to the different phones in the establishment incoming and inter-office calls, and makes connections with outside lines for outgoing calls.

209.588 General Clerk--Performs combination of clerical tasks not requiring knowledge of systems and procedures; proofreads, writes or types bills, statements, receipts or checks; sorts and files records; addresses and stuffs envelopes; answers telephone; stamps, sorts and delivers mail; operates office duplicating equipment.

222.387 Shipping and Receiving Clerk--Prepares merchandise for shipping or delivery. Selects goods orders; wraps, packs or crates for shipping or delivery. Addresses parcel or crate, weighs article and attaches postage or bill of lading. May also receive goods shipped to an establishment, unpack and verify or direct receiving checker in verifying the correctness of shipments against bill of lading, invoices or other records.

223,3871 Stock Clerk--Receives, stores and issues equipment, material, merchandise or tools in a stock room or storeroom.

207.7821 Duplicating Machine Operator--Reproduces duplicate copies of typewritten or handwritten matter using a machine which reproduces the master copy onto sheets of duplicate paper.

208.885 Collator Operator--Tends and adjusts controls of machines that assembles pages of printed material in numerical sequence. Places pages to be assembled in holding tray.

214.488A Accounting Clerks--May perform a number of tasks from beginning routine tasks such as posting items by hand to ledgers to the more experienced position which involves more varied assignments and greater responsibility, such as preparing summary reports as well as machine posting, etc.

214.488B Billing Machine Operator--Prepares statements bills and invoices to be sent to customers using billing machines. May make computations on separate adding and calculating machines.

210.388 Bookkeeper--Keeps complete and systematic set of records of business transactions of establishment. Duties may vary from simple record keeping to keeping a complete set of books including financial reports, depending on size of business.

215.388 Bookkeeping Machine Operator--Keeps set of records of business transactions using bookkeeping machine.

216.488 Calculating Machine Operator--Presses proper keys on keyboard and manipulates certain levers to operate a machine that automatically performs the basic arithmetic computations of adding, subtracting, multiplying and dividing.

216.388 Statistical Clerks and Compilers--Compiles regular and special reports for the use of the management and as a basis for statistical studies using the regular bookkeeping and accounting records as a source of information.

188.188 Assessor--Appraises real and personal property to determine its fair value and assesses taxes in accordance with prescribed schedules.

168.168 Building Inspector--Inspects buildings, issues permits and confers with contractors and property owners to enforce state and municipal building codes.

162.158 Purchasing Agent--Purchases machinery, equipment, tools, raw materials, parts, services, and supplies necessary for operation of an organization, such as a utility or government unit.

729.281 Electric-Meter Repairman--Inspects, adjusts, and repairs electric meters used for recroding electric current consumption.

824.381 Street-Light Serviceman--Maintains and repairs mercury-vapor, fluorescent, electric,arc, or incandescent street lights and traffic signals.

249.368 Library Assistant--Compiles records, sorts and shelves books, and issues and receives library materials, such as books, films and phonograph records.

899.381 Maintenance Man--A person engaged in repairing and maintaining buildings, machinery, electrical and mechanical equipment and grounds and public parks.

620.282 General Purpose Mechanic--Repairs and maintains trucks, buses and other vehicles by city, school district, or state garages.

812.884 Welder Combination--Welds metal parts together, according to layouts, blueprints or work orders, using both gas welding or brazing and any combination of arc welding processes.

860.381 Carpenter--Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard, using carpenter's handtools and power tools.

862.381A Plumber--Assembles, installs and repairs pipes, fittings and fixtures of heating, water and drainage systems, according to specifications and plumbing codes.

824.281 Electrician--Plans layout and installs and repairs wiring, electrical fixtures, apparatus and control equipment.

143.382 Photographer--Photographs persons suspected or convicted of crimes for identification, photographs land and property for loan and appraisal reports.

199.288 Traffic Technician--Conducts field studies to determine traffic volume, speed, effectiveness of signals, adequacy of lighting and other factors influencing traffic conditions.

MANPOWER NEEDS SURVEY QUESTIONNAIRE
(For the Public Voc-Tech Schools)

Instructions:

1. Please make an entry in each column for each job title listed below.
2. Check level at which training is being provided:
   (a) _____ Semi-skilled
   (b) _____ Skilled
   (c) _____ Technician

Type of School _____

Location _____

Department _____

_____
Title of person completing questionnaire

Code # (office use only)	Occupational areas	Number of students expected to have graduated by June				
		1978	1979	1980	1981	1982
	Agriculture					
001	Agricultural Management					
002	Agriculture Equipment Repair					
003	Agriculture Technology					
004	Forestry					
005	Landscaping-Gounds Maintenance					
006	Livestock Technology					
007	Dairy Technology					
008	Horticulture and Floriculture					
009	Irrigation Technology					
010	Agricultural Supply					
011	Agricultural Chemicals					
012	Other (please specify)					
	a.					
	b.					
	c.					
	Construction					
013	Surveying					
014	Technical Drafting					
015	Structural Engineering Technology					
016	Civil Engineering Technology					
017	Highway Engineering Technology					
018	Architectural Technology					
019	Building Construction Technology					
020	Carpentry					
021	Construction Technology					
022	Building Maintenance					
023	Others (please specify)					
	a.					
	b.					
	c.					

Code # (office use only)	269 Occupational areas	Number of students expected to have graduated by June				
		1978	1979	1980	1981	1982
	Electrical Occupations (including Electronics					
024	Electronic Engineering Technology					
025	Electronic Technology					
026	Radio and Television Servicing					
027	Radio Communications					
028	Industrial Electronics					
029	Electrical Construction and Wiring					
030	Computer Technology					
031	Appliance Repair					
032	Communications Technology					
033	Others (please specify					
	a.					
	b.					
	c.					
	Mechanical					
034	Automotive Mechanic					
035	Diesel Technology					
036	Mechanical Drafting & Machine Design					
037	Automotive Body Repair					
038	Industrial Mechanic					
039	Automotive Tune-up					
040	Office Machines Technology					
041	Heavy Equipment Technology					
042	Others (please specify					
	a.					
	b.					
	c.					
	Metal Working:					
043	Machine Tool Technology					
044	Mechanical Technology					
045	Welding Technology					
046	Machine Processes Technology					
047	Welding Processes Technology					
048	Metallic Inert Gas Welding					
049	Production Welding					
050	Machine Shop					
051	Metal Fabrication					
052	Others (please specify)					
	a.					
	b.					
	c.					

MANPOWER NEEDS SURVEY QUESTIONNAIRE

Code # (office use only)	270 Occupational areas	Number of students expected to have graduated by June				
		1978	1979	1980	1981	1982
	Business/Office Education					
	Secretarial:					
056	Secretarial Practice					
057	Legal Secretary					
058	Executive Secretary					
059	Administrative Secretary					
060	Technical Secretary					
061	Stenography					
062	Others (please specify)					
	a.					
	b.					
	c.					
	General clerical:					
063	General Office Practice					
064	Library Science					
065	Instructional Materials Technology					
066	Filing					
067	Sales					
064	Others (please specify)					
	a.					
	b.					
	c.					
	Bookkeeping and Accounting:					
069	Accounting and Financial Management					
070	Accounting Systems Programmer					
071	Accounting Technology					
072	Bookkeeping					
073	Data Processing					
074	Purchasing					
075	Others (please specify)					
	a.					
	b.					
	c.					

APPENDIX B. FOLLOW-UP LETTER

Joshua A. Ighado
766 Pammel Ct.
Iowa State University
Ames, Iowa 50010
October 10, 1978

Dear Employer:

It is almost three months since your direct involvement in an important research study was solicited. The objective of the manpower research was made clear to you and you however assured me of your cooperation.

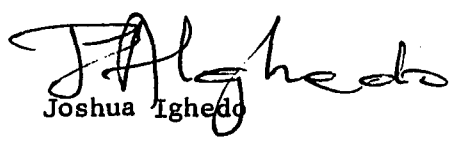
Then it was getting to the time for me to return to school, while due to your busy schedule you have not been able to complete the questionnaire, you however promised to mail them to me within September. I therefore felt it will be appropriate for me to remind you that I have not received your completed questionnaire.

Because of the high rating of your establishment by the State, the finding of this research will not be very reliable unless your response in included.

I have enclosed another copy of the questionnaire and self-addressed envelope in case you have misplaced the first questionnaire and my mailing address. It will be greatly appreciated if you can return your questionnaires before October 30.

I would like to thank you for your cooperation and help.

Sincerely yours,



Joshua Ighedo

APPENDIX C. EFFORTS TO OBTAIN FUNDS

Iowa State University of Science and Technology Ames, Iowa 50011

College of Education
Industrial Education
Telephone 515-294-1033

December 24, 1977

The Permanent Secretary
Bendel State Ministry of Education
Benin City, Nigeria

Dear Sir:

APPLICATION FOR SPONSORSHIP OF MANPOWER RESEARCH STUDY IN BENDEL STATE WITH IMPLICATION FOR VOCATIONAL-TECHNICAL EDUCATION

Mr. Joshua A. Ighedo is a Ph.D. degree student in Industrial Education Department at Iowa State University. His program is designed with emphasis on vocational-technical education personnel and curriculum development.

As part of the requirements for his M.Sc. degree, Mr. Ighedo studied the post-secondary vocational-technical programs in the State of Iowa with emphasis on building construction programs.

On the basis of the relevancy of the proposed research to his current program, we, members of his Graduate Committee have studied and approved the proposal submitted to us by Mr. Ighedo. The study will fullfill one of the major requirements for the Ph.D. degree.

Similar research studies done here provided major guidelines and justification for the establishment of vocational-technical programs, at various levels. We understand that Mr. Ighedo is being sponsored by your State Government.

Attached you will find a copy of the approved research proposal and a budget for carrying out the research. It is our experience that it is to the student's and sponsor's benefits to have research conducted within one's own country on pertinent problems facing education. We do hope that you will consider financing the study.

Sincerely,

William D. Wolansky
Professor and Head
Department of Industrial Education

Robert J. Gelina
Coordinator of Graduate Studies
Department of Industrial Education

COST ESTIMATED FOR THE PROPOSED STUDY

	Item	Cost
	Approximate duration of study -- 60 days	
1.	Air ticket from Des Moines to Benin including taxi to and from Des Moines and Benin	$ 813.00
	Return ticket	813.00
2.	Local travel Twice to the 14 divisional headquarters including Benin Twice to Agbor, Asaba, Sapele, Warri To Auchi College of Technology, and the five technieal colleges, and the Agricultural settlements	660.00
3.	Equipment	
	(a) Cassette recorder (might get one free)	
	(b) 30 cassette tapes at $1.50	45.00
	(c) Batteries	10.00
4.	Hotel accommodation (lodging)	400.00
5.	Food	670.00
6.	Data processing (computer)	185.00
7.	Typing, duplicating (about 250 pages at $1.60/page)	400.00
8.	Binding (10 copies at $10.00)	100.00
	Total cost	$4096.00

Iowa State University of Science and Technology Ames, Iowa 50011

College of Education
Industrial Education
Telephone 515-294-1033

July 27, 1978

Dr. Joseph Black
Director of Social Services
The Rockefeller Foundation
1133 Avenue of the Americas
New York, New York 10036

Dear Dr. Black:

We have an advanced Ph.D. degree candidate from Bendel State, Nigeria who is beginning his research on his dissertation topic. He did request research funds from his state government to conduct a manpower feasibility study in Bendel State, however, as of this date he has received no response. The intent of his research would be to establish a manpower data base for vocational technical education program planning.

Would it be possible for Joshua Ighedo to receive a research grant to conduct his research in Nigeria and return to ISU to complete the writing of the dissertation? A budget is included in the enclosed materials

Joshua is a very able student and will be returning to his home state upon graduation.

Enclosed is a copy of his proposal.

Sincerely,

William D. Wolansky
Professor and Head
Department of Industrial Education

WDW: dk

Enclosure

Joshua A. Ighedo
Industrial Education Department
Iowa State University
Ames, Iowa 50011
11 July, 1978

Dr. Joseph Black
Director of Social Sciences
The Rockefeller Foundation
1133 Avenue of the Americas
New York, New York 10036

Dear Dr. Black:

Subject: Application for Research Grant

I am a graduate student in the Industrial Education Department at Iowa State University. Upon the advice and recommendation of Dr. William D. Wolansky, Chairman of the Industrial Education Department and my major professor, I entered a Ph.D. program with emphasis on curriculum/program development after completing the Master's degree program. For the M.S. degree, I conducted a survey of building construction programs in the State of Iowa at the post-secondary level.

For my dissertation research I developed the attached proposal under the supervision of Dr. Wolansky, which was amended and then approved by my program committee. The major objective of the research is to determine the semi-skilled, skilled and technician level manpower needs of Bendel State in Nigeria; with implications for vocational-technical education program development at both post-primary and -secondary levels.

Bendel State closed down eight out of thirteen vocational-technical schools in the state in the 1974/75 school year and established a Technical Education Board under the Ministry of Education to administer the remaining five vocational-technical schools. The board was charged with the responsibility of modifying the existing programs and developing new ones according to need. However, the board had no manpower statistics available to them on which to base their plans. This proposal was therefore developed with a view toward helping the Ministry and the board obtain manpower statistics which will serve as a guide to their curriculum development efforts.

After the approval of my proposal, I sent a copy to the Ministry of Education at Bendel State asking for funds. In reply, the Ministry (the board inclusive) said that my sponsorship was meant to terminate after my Master's degree and that they only consider their own students for research grants. Other agencies or foundations that undertake funding of research studies that are known to me limit their activities to U.S. citizens and to studies conducted within the country.

The methods and procedures for achieving the objectives of the study are fully discussed in the proposal. In brief, personal visits will be conducted during which the purpose of the study will be explained to the respondent and any questions answered about the objectives of the project. The questionnaires will be distributed during the first visit, and a date will be fixed for collecting the completed questionnaire. Thus, two visits at least will be made to each respondent.

The research will be conducted by me with no assistance from any other person(s) since it is serving as my Ph.D. research.

Attached is a budget estimate covering travel, living and other relevant expenses.

Expecting to hear from you soon.

Thanks.

Sincerely yours,

Joshua A. Ighedo

JAI:cjd
Enclosures (2)

30 August, 78

SCH.37/74/71.

The Consul-General of Nigeria,
Consulate-General of Nigeria,
575 Lexington Avenue,
New York,
N.Y. 10022,
U.S.A.

PAYMENT OF RESEARCH GRANT
MR. J. A. IGHEDO: BENDEL STATE
GOVERNMENT POST-GRADUATE SCHOLAR

I am directed to inform you that a research grant covering air fare to and from Nigeria and the sum of₦268.75 have been approved for the above-named scholar.

2. Mr. Ighedo is already in Nigeria but would want the money to be paid to his account in New York.

3. You are also advised to pay Mr. Ighede's air passage to and from Nigeria.

(D. O. AKHIDENOR),
for Permanent Secretary,
(Scholarships Branch)
Higher Education Division

Our Ref. NO.SCH.37/74/71A.
Ministry of Education
Benin City

30 August, 1978.

cc :

Mr. Joshua . A. Ighedo,
P.O. Box 11,
Sapele.

Above for your information please.

(D. O. AKHIDENOR),
for Permanent Secretary,
(Scholarships Branch),
Higher Education Division.

CABLE ADDRESS:
FORDWAN, LAGOS
NIGERIA

OFFICE OF THE
REPRESENTATIVE
FOR WEST AFRICA

THE FORD FOUNDATION
47, MARINA, P. O. BOX 2368,
LAGOS.

TELEPHONES: 27525 (5 LINES)

280

October 4, 1978

Mr. Jan Bower
Research Associate
PREPS/Research Services
Iowa State University
204 Beardshear Hall
Ames, Iowa 50011
U.S.A.

Dear Mr. Bower:

On July 24, 1978, Ms. Susan Goodwillie of our New York office,acknowledged receipt of a dissertation proposal from Mr. Joshua A. Ighedo. That letter and the attached proposal have finally reached me in Lagos. I apologize for the inconvenience caused by this unusual delay in the mail.

I regret that we are unable to support Mr. Ighedo's research plans. The funds that we possess for dissertation research are very limited. In recent years, we have applied them, with few exceptions, to candidates undertaking graduate programs within the social sciences and generally as part of our contribution to staff development programs of West African institutions, in the case of Nigeria, mainly universities. Increasingly, we are directing these funds to students actually enrolled in graduate programs in universities in West Africa.

Mr. Ighedo's proposal is very well formulated. His research plan is feasible and his topic is of much interest here. It is, therefore, regrettable that we are unable to assist him. Our reasons, as cited, bear no judgment on the quality of importance of his proposal. Rather we must husband our limited funds with care and apply them in ways that we judge to be most effective for the development of institutions in this region.

Sincerely,

Robert S. Drysdale
Representative for West Africa

RSD/oe

APPENDIX D. BENDEL STATE INDUSTRIAL DIRECTORY AND MANPOWER SURVEY SAMPLE QUESTIONNAIRE

MINISTRY OF ECONOMIC DEVELOPMENT
(STATISTICS DIVISION)
P.M.B. 1061
BENIN CITY
BENDEL STATE OF NIGERIA

BENDEL STATE INDUSTRIAL DIRECTORY AND MANPOWER SURVEY, 1977

Authorisation:

This Survey is authorised under the Statistical Act of 1957 and by the State Government. Please complete immediately and return to the enumerator who carries with him an official identity card. Your co-operation is very necessary. The information supplied will be treated confidentially. Report the establishment's position as at 1st August 1977.

1. Local Government Area: .....
2. Name of Establishment: .....
   .....
3. Physical Location: .....
4. Full Postal Address: .....
   .....
5. Telephone Number (if any): .....
6. Head Office Address if different from (4) .....
   .....
7. Year Operation started: .....
8. Nature of Activity (Describe in Detail): .....
   .....
   .....
9. Type of Establishment (Tick appropriate Box):

   ☐ Fed. Govt. ☐ Local Govt. ☐ Fed. Corporation

   ☐ Voluntary Agency ☐ State Govt. ☐ State Corporation

   ☐ Private Company ☐ Private Enterprise

   ☐ Other (Specify) .....

10. Number of Employees on PAYROLL as at 1st August, 1977

    Males ..... Females ..... Total .....

11. Number of unpaid workers (such as family workers, apprentices) as at 1st August 1977, Male ..... Female ..... Total .....

12. Workers by Occupation:

283

OCCUPATION	WORKERS AS AT 1ST AUGUST, 1977					Vacancies
	Employees		Unpaid Workers		Total	
DESCRIPTION	M	F	M	F		
A. SENIOR ADMINISTRATIVE & MANAGERIAL						
1. General Managers/Managing Directors						
2. Administrative Managers						
3. Personnel Managers						
4. Public Relations Officers						
5. Other Managers (Specify).....						
.....						
B. INTERMEDIATE ADMINISTRATIVE & MANAGERIAL						
1. Assistant Managers						
2. Assistant Public Relations Officers						
3. Confidential Secretaries & Stenographers						
4. Supervisors						
5. Others (Specify)						
.....						
C. SENIOR TECHNICAL, SCIENTIFIC AND PROFESSIONAL						
I. Engineering & Allied Fields						
1. Architects						
2. Quantity Surveyors						
3. Estate Surveyors						
4. Land Surveyors						
5. Civil/Structural Engineers						
6. Electrical/Electronic Engineers						
7. Marine Engineers						
8. Mechanical Engineers						
9. Chemical Engineers						
10. Petroleum Engineers						
11. Mining Engineers						
12. Aircraft Pilots & Navigators						
13. Ship Deck Officers & Pilots						
14. Agricultural Engineers						
15. Other Engineers (Specify)..						
.....						

...../3

OCCUPATION	WORKERS AS AT 1ST AUGUST, 1977					Vacancies
	Employees		Unpaid Workers		Total	
DESCRIPTION	M	F	M	F		
II. Medical & Health Manpower						
16. General Practitioners						
17. Physicians						
18. Obst. & Gynae. Specialists						
19. Radiologists						
20. E. N. T. Specialists						
21. Paediatricians						
22. Surgeons						
23. Psychiatrists						
24. Pathologists (Medical)						
25. Orthopaedic Specialists						
26. Anaesthetists						
27. Medical Health Doctors						
28. Medical Lab. Technologists						
29. Ophthalmologists						
30. Dentists						
31. Pharmacists						
32. Optometrists/Opticians						
33. Dieticians & Nutritionists						
34. Physiotherapists and Occupational Therapists						
35. Other Specialists (Specify)....						
.....						
III. Agricultural Staff						
36. Agronomists (including Soil Scientists & Horticulturists)						
37. Veterinarians						
38. Pathologists (Veterinary/ Plant)						
IV. Other Scientists						
39. Chemists						
40. Physicists						
41. Geologists						
42. Geophysicists						
43. Biologists (including Zoologists & Botanists)						
44. Lab. Technologists (Industrial)						
45. Other Technologists (Specify).....						
.....						

.....4

OCCUPATION	WORKERS AS AT 1ST AUGUST, 1977					Vacancies
	Employees		Unpaid Workers		Total	
DESCRIPTION	M	F	M	F		
V. Other Professionals						
46. Accountants/Auditors						
47. Legal Practitioners						
48. Librarians/Archivists						
49. Painters/Sculptors						
50. Actors, Musicians & Dancers						
51. Auctioneers, Valuers & Appraisers						
52. Others (Specify).....						
.....						
D. INTERMEDIATE TECHNICAL SCIENTIFIC & PROFESSIONAL						
I. Engineering & Allied Fields						
1. Survey Technicians						
2. Marine Engineering Technicians/Assistants						
3. Mechanical Engineering Tech.						
4. Chemical Engineering Technicians						
5. Mining Engineering Tech.						
6. Draughtsmen						
7. Other Aeronautical Staff (Specify)						
8. Other Deck Staff (Specify)						
.....						
9. Other Eng. Technicians not elsewhere classified						
II. Medical and Health Staff						
10. Pharmaceutical Assistants						
11. Midwives/Nurses						
12. X-Ray technicians & Radiographers						
13. Medical Lab. Technicians						
14. Masseurs						
15. Sanitory Inspectors						
16. Other Medical/Health Technicians						

...../5

OCCUPATION	WORKERS AS AT 1ST AUGUST, 1977					Vacancies
	Employees		Unpaid Workers		Total	
DESCRIPTION	M	F	M	F		
III. Agricultural Staff						
17. Veterinary Technicians						
18. Agricultural Superintendents						
IV. Other Intermediate Technical & Professional workers						
19. Science Technicians						
20. Laboratory Assistants						
21. Assistant Accountants and Auditors						
22. Foremen						
23. Assistant Librarians/ Asst. Archivists						
24. Salesmen-Insurance Services, etc.						
25. Salesmen-Commodities						
E. CLERICAL STAFF						
1. Accounts Clerks/Cashiers						
2. Typists						
3. Other Clerical Staff						
F. ARTISANS AND TRADESMEN						
1. Electricians						
2. Mechanics						
3. Spray/Sign Writers						
4. Welders (Gas & Electric)						
5. Carpenters						
6. Masons/Bricklayers						
7. Plumbers/Fitters						
8. Drivers						
9. Other Transport Workers						
10. Operators (Tractors, Crane, etc.)						
11. Tailors						
12. Telecommunication Operators						
13. Shoemakers						
14. Mattress makers						
15. Blacksmiths, Moulders and related workers						
16. Watchmakers & Repairers, Jewellers						
17. Printers						
18. Compositors & related workers						

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OCCUPATION	WORKERS AS AT 1ST AUGUST, 1977					Vacancies
	Employees		Unpaid Workers		Total	
DESCRIPTION	M	F	M	F		
19. Brick/Block makers						
20. Bakers						
21. Brewers						
22. Butchers						
23. Photographers						
24. Paper Product makers						
25. Cooks						
26. Launderers & Dry Cleaners						
27. Barbers and Hairdressers						
28. Other Artisans and Tradesmen (Specify).....						
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.....						
Other Occupations not elsewhere Classified						
1. Wholesale Traders (proprietors)						
2. Retail Traders (proprietors						
3. Unskilled Labourers e.g. Postmen, Cleaners, Wardmaids/ Orderlies, Messengers, etc.						
4. Casual Labourers (Daily rated)						
5. Others (Specify)						
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